Selbstbericht im Rahmen der Zwischenevaluation:

Juniorprofessur für Komposition und Musiktheorie in postdigitalen Bildungsräumen

BEGLEITDOKUMENTATION

Anlage 9c: Drittmittel – Antrag drei

Jun.-Prof. Dr. Lawrence Wilde

Adolf-Reichwein-Straße 2
57068 Siegen

European Research Council (ERC) – Starting Grant (1,5 Mio. €)

Projekttitel: *AI-Accelerated Creativity Theory: The Future of Music Composition with Generative Artificial Intelligence (AI-ACT)*

<u>Bewertung</u>: Note B

Für den ERC-Starting Grant reichte ich den Projektvorschlag AI-ACT ein, der untersuchen sollte, wie generative KI kreative Prozesse in der Musik neu gestaltet. Vorgeschlagen wurde CoCo, eine quelloffene VST-Suite für künstlerisch kontrolliertes KI-Training. Das Projekt verband Theorie, Design und künstlerische Forschung, um ethische Mensch-Maschine-Kollaboration zu analysieren. Trotz Nichtbewilligung erhielt der Antrag positive Bewertungen und definierte einen langfristigen Forschungspfad zur KI-gestützten Kreativität.

- ❖ *Den vollständigen Antrag (ab Seite 3 dieses Dokuments) und das Gutachten (ab Seite 63) finden Sie weiter unten.*

HORIZON

Call: ERC-2025-STG
(Call for Proposals for ERC Starting Grant)

Topic: ERC-2025-STG
Type of Action: HORIZON-ERC

Proposal number: 101220792

Proposal acronym: AI-ACT

Type of Model Grant Agreement: HORIZON Action Grant Budget-Based

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Section	Title	Action
1	General information	
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1 - General information

Fields marked * are mandatory to fill.

Topic	ERC-2025-STG	Type of Action	HORIZON-ERC
Call	ERC-2025-STG	Type of Model Grant Agreement	HORIZON-AG

Acronym   AI-ACT

Proposal title   AI-Accelerated Creativity Theory: The Future of Music Composition with Generative Artificial Intelligence

Note that for technical reasons, the following characters are not accepted in the Proposal Title and will be removed: < > " &

Duration in months*   60

Primary ERC Review Panel*   SH8 - Studies of Cultures and Arts

Secondary ERC Review Panel   Not applicable   (if applicable)

ERC Keyword 1*   SH8_08 Visual and performing arts, screen, arts-based research

Please select, if applicable, the ERC keyword(s) that best characterise the subject of your proposal in order of priority.

ERC Keyword 2   *Not applicable*

ERC Keyword 3   *Not applicable*

ERC Keyword 4   *Not applicable*

Free keywords   *Music composition, Generative Artificial Intelligence, Creativity, Postdigital, Human–computer interaction, Creative process, Paradox of acceleration, AI-Accelerated creativity*

Application forms

Proposal ID **101220792**

Acronym **AI-ACT**

Abstract *

The rise of generative artificial intelligence (GenAI) in music presents transformative possibilities and significant challenges. While the technological and ethical implications of AI have garnered attention, its impact on human creativity and artistic processes remain underexplored. The AI-Accelerated Creativity Theory (AI-ACT) research project addresses these challenges with three key objectives. First, it will build Co-Composer (CoCo), a suite of GenAI Virtual Studio Technology (VST) tools that empower artists to train AI models on their own creative work, enabling personalized collaboration with AI beyond Big Data training and facilitating the development of the composer's unique artistic voice. Secondly, AI-ACT will establish a theoretical framework to empirically study human creativity with GenAI, focusing on what the project identifies as the 'paradox of acceleration' – the capacity of AI to accelerate and decelerate different stages of the creative process. Finally, the project will integrate the newly developed tools and theoretical framework through the composition and performance of original multimedia works utilizing CoCo and AI-ACT. These public concerts will be held (1) nationally in Germany, (2) within the European Union, and (3) internationally, expanding the project's research impact. AI-ACT adopts an innovative research approach in its interdisciplinary methodology, bridging Design-Based Research (DBR), Arts-Based Research (ABR), and qualitative methods to study the intersection of human creativity and AI in music composition. The Principal Investigator (PI), an experienced composer-researcher with expertise in music, digital technology, and transdisciplinary research, will lead the AI-ACT team, which includes two postdoctoral researchers, two PhD students, and one student assistant. The project will contribute to new knowledge in AI-music collaboration, shaping future creative practices and research methodologies.

Remaining characters   33

Has this proposal (or a very similar one) been submitted in the past 2 years in response to a call for proposals under any EU programme, including the current call?   ○ Yes   ⦿ No

Please give the proposal reference or contract number.

Previously submitted proposals should be with either 6 or 9 digits.

Application forms

Proposal ID **101220792**

Acronym **AI-ACT**

Declarations

1) We declare to have the explicit consent of all applicants on their participation and on the content of this proposal. * ☒

2) We confirm that the information contained in this proposal is correct and complete and that none of the project activities have started before the proposal was submitted (unless explicitly authorised in the call conditions). * ☒

3) We declare:
   - to be fully compliant with the eligibility criteria set out in the call
   - not to be subject to any exclusion grounds under the EU Financial Regulation 2018/1046
   - to have the financial and operational capacity to carry out the proposed project. * ☒

4) We acknowledge that all communication will be made through the Funding & Tenders Portal electronic exchange system and that access and use of this system is subject to the Funding & Tenders Portal Terms and Conditions. * ☒

5) We have read, understood and accepted the Funding & Tenders Portal Terms & Conditions and Privacy Statement that set out the conditions of use of the Portal and the scope, purposes, retention periods, etc. for the processing of personal data of all data subjects whose data we communicate for the purpose of the application, evaluation, award and subsequent management of our grant, prizes and contracts (including financial transactions and audits). * ☒

6) We declare that the proposal complies with ethical principles (including the highest standards of research integrity as set out in the ALLEA European Code of Conduct for Research Integrity, as well as applicable international and national law, including the Charter of Fundamental Rights of the European Union and the European Convention on Human Rights and its Supplementary Protocols. Appropriate procedures, policies and structures are in place to foster responsible research practices, to prevent questionable research practices and research misconduct, and to handle allegations of breaches of the principles and standards in the Code of Conduct. * ☒

7) We declare that the proposal has an exclusive focus on civil applications (activities intended to be used in military application or aiming to serve military purposes cannot be funded). If the project involves dual-use items in the sense of Regulation 428/2009, or other items for which authorisation is required, we confirm that we will comply with the applicable regulatory framework (e.g. obtain export/import licences before these items are used). * ☒

8) We confirm that the activities proposed do not
   - aim at human cloning for reproductive purposes;
   - intend to modify the genetic heritage of human beings which could make such changes heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed), or
   - intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.
   - lead to the destruction of human embryos (for example, for obtaining stem cells)
These activities are excluded from funding. * ☒

9) We confirm that for activities carried out outside the Union, the same activities would have been allowed in at least one EU Member State. * ☒

The coordinator is only responsible for the information relating to their own organisation. Each applicant remains responsible for the information declared for their organisation. If the proposal is retained for EU funding, they will all be required to sign a declaration of honour.

False statements or incorrect information may lead to administrative sanctions under the EU Financial Regulation.

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This proposal version was submitted by **Lawrence Wilde** on **15/10/2024 05:03:49** Brussels Local Time. Issued by the Funding & Tenders Portal Submission System.

2 - Participants

List of participating organisations

#	Participating Organisation Legal Name	Country	Role	Action
1	UNIVERSITAET SIEGEN	Germany	Coordinator	

Organisation data

Host Institution

PIC	Legal name
999849617	*UNIVERSITAET SIEGEN*

Short name: UNIVERSITAET SIEGEN

Address

Street	ADOLF REICHWEIN STRASSE 2A
Town	SIEGEN
Postcode	57076
Country	Germany
Webpage	www.uni-siegen.de

Specific Legal Statuses

Legal person	yes
Public body	yes
Non-profit	yes
International organisation	no
Secondary or Higher education establishment	yes
Research organisation	yes

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	11/02/2016 - no
SME self-assessment	unknown
SME validation	unknown

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Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below?   ⊙ Yes   ○ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
  - o work-life balance and organisational culture;
  - o gender balance in leadership and decision-making;
  - o gender equality in recruitment and career progression;
  - o integration of the gender dimension into research and teaching content;
  - o measures against gender-based violence including sexual harassment.

Departments carrying out the proposed work

Department 1

Department name	Institute of Music	☐ not applicable
	☐ Same as proposing organisation's address	
Street	Adolf-Reichwein-Str. 2	
Town	Siegen	
Postcode	57068	
Country	Germany	

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Principal Investigator

The following information of the Principal Investigator (PI) is used to personalise the communications. The EU services will contact the PI together with the HI contact person concerning this proposal (e.g. for additional information, invitation to interviews, sending of evaluation results, convocation to start grant preparation). Please make sure that your personal information is accurate and please inform the ERC in case your e-mail address changes by using the call specific e-mail address indicated in the below webpage. Please also provide your mobile phone number as we may need to urgently contact you regarding your submitted proposal and/or potential interview.

https://erc.europa.eu/about-erc/contact-us

The name and e-mail of contact persons including the Principal Investigator, Host Institution contact are read-only in the administrative form, only additional details can be edited here. To give access rights and contact details of contact persons, please save and close this form, then go back to Participants Step of the submission wizard and save the changes.

ORCID: 0009-0005-7198-9527

Researcher ID:

The maximum length of the identifier is 11 characters (ZZZ-9999-2010) and the minimum length is 9 characters (A-1001-2010).

Other ID: *Please enter the type of ID here* *Please enter the identifier number here*

Career Stage: Category C Recognised researcher

Last Name*	Wilde	Last Name at Birth	Boguinia
First Name(s)*	Lawrence	Gender*	⦿ Male ◯ Female ◯ Non Binary
Title	Dr	Country of residence	Germany
Nationality*	United States	Country of Birth*	Russia
Date of Birth* (DD/MM/YYYY)	05/04/1991	Place of Birth*	Stavropol

Contact address

Current organisation name	University of Siegen
Current Department/Faculty/Institute/Laboratory name	Faculty II: Education · Architecture · Arts / Institute of Music

☐ Same as organisation address

Street	Adolf-Reichwein-Str. 2		
Postcode/Cedex	57068	Country*	Germany
Town*	Siegen		
Phone	+491622834053	Phone2 / Mobile	+491622834053
E-mail*	lawrence.wilde@uni-siegen.de		

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Acronym **AI-ACT**

Contact address of the Host Institution and contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr   Gender ⦿ Male ◯ Female ◯ Non Binary

First name* **Peter**   Last name* **Stolpp**

E-Mail* **peter.stolpp@zv.uni-siegen.de**

Position in org. EU Referent

Department Referat Forschungsförderung   ☐ Same as organisation name

☒ Same as proposing organisation's address

Street ADOLF REICHWEIN STRASSE 2A

Town SIEGEN   Post code 57076

Country Germany

Website www.uni-siegen.de

Phone +492717404940   *Phone 2* *+xxx xxxxxxxx*

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3 - Budget

Beneficiary Short Name	PI	Senior staff	Post docs	Students	Other staff	A. Total personnel costs/€	B. Subcontracting Costs/€ (No indirect costs)	C.1 Travel and subsistence	C.2 Equipment - including major equipment	Consum-ables incl. fieldwork and animal costs	Publications (incl. Open Access fees) and dissemination	Other additional direct costs	C.3 Total other goods, works and services	C. Total Purchase costs/€	D. Internally invoiced goods and services/€ (No indirect costs)	E. Indirect Cost/€	Total Eligible Costs	Requested EU contribution /€
Universitaet Siegen	0	0	588824	400285	37340	1026449.00	45000	28500	48600	0	30000	16800	46800.00	123900.00	0	287587.25	1482936.25	1482936.25
Total	0	0	588824	400285	37340	1026449.00	45000	28500	48600	0	30000	16800	46800.00	123900.00	0	287587.25	1482936.25	1482936.25

Section C. Resources

A. Total Personnel Costs Justification:

The AI-ACT project's success depends on a skilled team. Personnel costs are vital for attracting and retaining experts, providing support for technical and creative tasks. Costs for the scientific staff were calculated in consultation with the central administration of the host and on the basis of the applicable collective agreement (the Tarifvertrag der Länder, TV-L for researchers, and salary tables of the host for student/research assistants), with small increases to compensate for inflation.

PI: Since 1 April 2023, the PI holds a tenure-track position as junior professor at the University of Siegen. This is financed by a national funding programme (Federal Ministry of Education and Research). After a successful tenure-track evaluation, the PI will receive a full W2 professorship at the University of Siegen. The University of Siegen provides a guarantee in the unlikely event of a negative tenure-track evaluation. The salary of the PI is thus secured for the entire period and will not be requested from the ERC budget.

Postdoctoral Researchers (2 Postdocs)
Two postdocs will develop the Co-Composer (CoCo) VST suite and the AI-Accelerated Creativity Theory (AI-ACT).
They will need expertise in machine learning, composition, and DAW integration.

• Postdoc 1 (100% FTE, months 7–42) will lead CoCo's design, prototyping, and early AI-ACT framework development.
• Postdoc 2 (100% FTE, months 25–60) will refine and finalize CoCo and support its release.

PhD Students (2 PhDs)

Two PhD students will help develop CoCo and AI-ACT, each focusing on a different music genre.

• PhD 1 (Popular Music, 65% FTE, months 7–48) will test CoCo in popular music and explore AI-enhanced creativity.
• PhD 2 (Concert Music, 65% FTE, months 19–60) will apply CoCo in concert music, including electro-acoustic styles.

Both will contribute to the AI-ACT framework through research and compositions.

Student Assistant (SHK)
A Student Assistant (8 hours/week, months 1–60) will provide administrative support, assist with workshops, interviews, data collection, and CoCo's open-source release.

Total Personnel Costs
The personnel costs for two postdocs, two PhD students, and a student assistant total €1,026,449, ensuring talent recruitment and successful project execution. These roles are critical to delivering CoCo, AI-ACT, and international presentations.

B. Subcontracting Costs Justification:

The AI-ACT project's subcontracting costs of €45,000 cover professional ensembles for three public concerts, crucial for showcasing the Co-Composer (CoCo) VST suite and AI-ACT framework.
These performances are essential for bringing the research to life for international audiences.

Costs cover:
1. National Concert (Germany) – €10,000
Held at the University of Siegen, this first public presentation will feature a small ensemble. Costs follow the "Berliner Modell" for fair pay. Feedback from this event will guide further project development.

2. European Concert – €15,000
This concert in Europe, featuring a larger ensemble, will broaden the project's visibility. Costs are based on fair market rates for professional musicians.

3. International Concert – €20,000
The final concert on an international stage will showcase the project's results with a large ensemble. Costs reflect the event's scale and complexity.

These costs adhere to industry standards for fair compensation and are vital for project dissemination and data collection on how AI tools interact with live musicians and audiences.

C.1 Travel and Subsistence Costs Justification:

The AI-ACT project's travel costs of €28,500 cover necessary national, European, and international trips for the PI, postdocs, PhD students, and external experts.
These trips support conference participation, research dissemination, collaboration, and integration into broader academic and artistic communities.

Justification for Costs:
• Research Dissemination: Conferences present findings like the CoCo VST and AI-ACT to global audiences.
• Collaboration: External experts and networking help refine the project.
• Visibility: International presence boosts the project's visibility.
• Community Integration: Participation ensures the team stays updated on AI and music technology while contributing to these fields.

One national, two European and two international trips are planned for the PI, and one national, one European and one international trip for each of the two Postdocs and PhD students. All costs are based on reasonable estimates, €400 for a national, €750 for a European and €2000 for a international trip per person.

In addition, five international trips by external experts to the University of Siegen are planned for the exchange of knowledge; 5 x €2000. The €28,500 total ensures effective international presence, partnerships, and research dissemination.

C.2 Equipment Including Major Equipment Costs Justification:

The AI-ACT project's equipment costs total €48,600, covering hardware, displays, software licenses, and storage needed for AI model training, music composition, and data processing.

Breakdown:
1. Mac Studios (€30,100)
• Three Mac Studios (M2 Ultra, €7,700/unit) for PI and Postdocs.
• Two Mac Studios (M2 Max, €3,500/unit) for PhD students.

These provide computational power for AI training, real-time processing, and music generation.
2. Studio Displays (€9,200)
• Five Studio Displays (€1,840/unit) for high-resolution visuals, used for DAW interfaces, music composition, and data analysis.

3. Software Licenses (€7,400)
• Max + RNBO, Ableton Live Suite, and JUCE C++ Indie licenses for AI tools, VST plugins, and music production.

4. External Storage (€1,900)
• Five LaCie Rugged SSD Pro (2TB, €380/unit) for secure, portable storage of large datasets, AI models, and multimedia files.

Justification for Costs:
These high-performance systems, displays, software, and storage are essential for AI tool development, CoCo VST testing, and real-time multimedia creation. The hardware ensures smooth interaction between composers and AI, while the software supports music production, programming, and AI research. External storage enables secure handling of large datasets.

The total cost of €48,600 includes a 5% margin to accommodate potential price increases. This ensures the project can adapt to future fluctuations in hardware and software costs, ensuring the necessary tools for success. The usual depreciation rules at the host institution were taken into account in the calculation.

Consumables: not applicable

Publications and Dissemination Costs Justification:

The AI-ACT project's publication costs total €30,000, covering open-access fees for 12 high-impact journal articles (€2,500 each), ensuring the research is widely accessible.
Open-access is key for sharing the project's outcomes with global academic, artistic, and AI communities, it will:

• Maximize visibility of the AI-ACT framework, Co-Composer (CoCo) VST, and original compositions.
• Support the adoption of innovative tools and insights by researchers and practitioners.

• Ensure rapid dissemination, impacting AI, music composition, and Human-AI Interaction fields.

Open-access guarantees global reach and long-term impact for the project.

Other Additional Direct Costs Justification:

The total for Other Direct Costs is €16,800, covering conference fees and the final audit.

• Conference Fees (€6,800): This covers registration for 17 conferences (€400 each), essential for sharing AI-ACT findings, fostering collaboration, and receiving feedback. Conference attendance engages the global academic community.
• Certificate on the financial statements (€10,000): A financial audit at the project's end ensures compliance and proper fund management, giving assurance to the funding body.

Internally invoiced goods and services: not applicable

Remaining characters   105

4 - Ethics & security

Ethics Issues Table

1. Human Embryonic Stem Cells and Human Embryos			Page
Does this activity involve Human Embryonic Stem Cells (hESCs)?	○ Yes ● No		
Does this activity involve the use of human embryos?	○ Yes ● No		

2. Humans			Page
Does this activity involve human participants?	● Yes ○ No		B2p7
Are they volunteers for non medical studies (e.g. social or human sciences research)?	● Yes ○ No		B2p7
Are they healthy volunteers for medical studies?	○ Yes ● No		
Are they patients for medical studies?	○ Yes ● No		
Are they potentially vulnerable individuals or groups?	○ Yes ● No		
Are they children/minors?	○ Yes ● No		
Are they other persons unable to give informed consent?	○ Yes ● No		
Does this activity involve interventions (physical also including imaging technology, behavioural treatments, etc.) on the study participants?	○ Yes ● No		
Does this activity involve conducting a clinical study as defined by the Clinical Trial [Regulation (EU 536/2014)](#)? (using pharmaceuticals, biologicals, radiopharmaceuticals, or advanced therapy medicinal products)	○ Yes ● No		

3. Human Cells / Tissues (not covered by section 1)			Page
Does this activity involve the use of human cells or tissues?	○ Yes ● No		

4. Personal Data			Page
Does this activity involve processing of personal data?	○ Yes ● No		
Does this activity involve further processing of previously collected personal data (including use of preexisting data sets or sources, merging existing data sets)?	○ Yes ● No		
Is it planned to export personal data from the EU to non-EU countries?	○ Yes ● No		
Is it planned to import personal data from non-EU countries into the EU or from a non-EU country to another non-EU country?	○ Yes ● No		
Does this activity involve the processing of personal data related to criminal convictions or offences?	○ Yes ● No		

5. Animals			Page
Does this activity involve animals?	○ Yes ● No		

6. Non-EU Countries			Page
Will some of the activities be carried out in non-EU countries?	● Yes ○ No		B2p10

> South Korea and United States

In case non-EU countries are involved, do the activities undertaken in these countries raise potential ethics issues?	○ Yes	◉ No	
It is planned to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?	○ Yes	◉ No	
Is it planned to import any material (other than data) from non-EU countries into the EU or from a non-EU country to another non-EU country? For data imports, see section 4.	○ Yes	◉ No	
Is it planned to export any material (other than data) from the EU to non-EU countries? For data exports, see section 4.	○ Yes	◉ No	
Does this activity involve low and/or lower middle income countries, (if yes, detail the benefit-sharing actions planned in the self-assessment)	○ Yes	◉ No	
Could the situation in the country put the individuals taking part in the activity at risk?	○ Yes	◉ No	

7. Environment, Health and Safety			Page
Does this activity involve the use of substances or processes that may cause harm to the environment, to animals or plants.(during the implementation of the activity or further to the use of the results, as a possible impact) ?	○ Yes	◉ No	
Does this activity deal with endangered fauna and/or flora / protected areas?	○ Yes	◉ No	
Does this activity involve the use of substances or processes that may cause harm to humans, including those performing the activity.(during the implementation of the activity or further to the use of the results, as a possible impact) ?	○ Yes	◉ No	

8. Artificial Intelligence			Page
Does this activity involve the development, deployment and/or use of Artificial Intelligence-based systems?	◉ Yes	○ No	B2p1

9. Other Ethics Issues			Page
Are there any other ethics issues that should be taken into consideration?	○ Yes	◉ No	

I confirm that I have taken into account all ethics issues above and that, if any ethics issues apply, I will complete the ethics self-assessment as described in the guidelines How to Complete your Ethics Self-Assessment	☒

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Ethical dimension of the objectives, methodology and likely impact
</div>

The AI-Accelerated Creativity Theory (AI-ACT) project involves ethical considerations, particularly in human-AI collaboration in music composition. The ethical dimension of the project spans data collection, participant engagement, intellectual property, AI usage, and broader societal implications of generative AI (GenAI) in artistic practices.

Informed consent and data privacy will be at the forefront of the project, particularly in the social sciences research focused on understanding human-AI interaction in creativity. Data will be collected through qualitative methods, including interviews, focus groups, and observational studies that document composers' and musicians' engagement with AI music tools. Participants will receive detailed information about the study's goals and how their data will be used, ensuring fully informed consent. Data collection will follow stringent data privacy regulations, including compliance with the General Data Protection Regulation (GDPR). All personal data will be anonymized and stored securely, accessible only by authorized project members. Clear documentation and protocols for handling sensitive information will ensure transparency and safeguard participants' privacy.

Ensuring transparency and respect for participants' rights will be central to the project's ethical approach. Composers and musicians will be fully informed about how AI tools, such as the Co-Composer (CoCo) VST suite, use their creative data, particularly for AI model training. Participants will have the right to control their creative contributions, and the project will ensure that any AI-generated content based on their works is treated ethically, respecting their intellectual property. To facilitate this, we will maintain regular communication with participants, offering opportunities for feedback and adjustments throughout the study.

The project will establish regular ethics review meetings with the host university ethics advisors to monitor adherence to ethical guidelines throughout the project. These reviews will include audits of informed consent processes, data handling protocols, and the intellectual property agreements between the participants and the project. Any issues raised will be addressed immediately, with actions documented for transparency and accountability.

Intellectual property (IP) rights will be carefully managed. AI-generated music raises important questions regarding the ownership of such works. The project will establish clear guidelines around IP, ensuring that composers retain ownership of their original data and contributions while clarifying how AI-generated outputs are attributed. Collaboration agreements will outline the rights of each participant, and the project will continually review these policies to remain compliant with evolving legal standards.

Regarding AI ethics, the project will adhere to principles of fairness, transparency, and accountability in AI development. CoCo will be designed to avoid the unauthorized use of copyrighted material, distinguishing itself from some existing GenAI tools that rely on unlicensed datasets. The project will exclusively use composer-supplied data, ensuring that all AI training respects participants' intellectual property and creative autonomy. Regular internal audits will ensure that all project activities comply with legal and ethical standards, and participants will have opportunities to raise concerns during the project's life cycle.

The AI-ACT project is committed to upholding the highest ethical standards in terms of participant rights, data privacy, intellectual property, and the responsible use of AI. Through proactive monitoring, ethics reviews, and transparent communication with participants, we will ensure that the project adheres to ethical guidelines and addresses the complexities of human-AI collaboration in a socially responsible manner.

Remaining characters   1095

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Compliance with ethical principles and relevant legislations
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The AI-Accelerated Creativity Theory (AI-ACT) project is fully committed to compliance with ethical principles and relevant legislation at both the national and international levels. The project will adhere to the European Union's Guidelines on Ethics in Artificial Intelligence: Context and Implementation, published by the European Parliamentary Research Service (EPRS), ensuring that all AI systems developed under the project are aligned with the ethical principles of transparency, accountability, fairness, and respect for human rights. In particular, the project will integrate the EU's Seven Key Requirements for Trustworthy AI, as outlined in the Ethics Guidelines for Trustworthy Artificial Intelligence (AI), which include:

1. Human Agency and Oversight – The AI systems developed (such as the Co-Composer VST suite) will enhance, rather than replace, human creativity. The role of human agency will be central, ensuring that AI remains a supportive tool in the creative process.

2. Technical Robustness and Safety – The AI systems developed will undergo rigorous testing to ensure they are reliable, secure, and function within safe parameters, particularly in real-time music composition scenarios.

3. Privacy and Data Governance – The project will comply with the General Data Protection Regulation (GDPR), ensuring that participants' data is handled securely and ethically. All personal data, including creative data contributed by composers, will be anonymized and stored securely, with strict protocols in place to ensure data privacy and compliance with EU data protection laws.

4. Transparency – Clear documentation will be provided to participants about how AI models use their creative data. The project will ensure transparency in AI operations, allowing users to understand how outputs are generated and offering explanations for AI-driven decisions in creative workflows.

5. Diversity, Non-Discrimination, and Fairness – The AI-ACT project will actively promote inclusion and diversity in its design, ensuring that the AI models are trained on data that reflect a wide range of musical styles and creative processes. The project will also adopt policies to avoid biases in the AI systems developed, ensuring fair treatment of all users and participants.

6. Environmental and Societal Wellbeing – The project will consider the broader societal implications of AI in creative industries and seek to minimize environmental impact through efficient use of computing resources and sustainable research practices.

7. Accountability – The project will establish clear accountability mechanisms to address any issues related to the misuse or unintended consequences of AI systems. An independent ethics advisor will oversee the project's adherence to these principles.

In addition to the EPRS guidelines, the AI-ACT project will also comply with EU Directive 2019/790 on Copyright in the Digital Single Market to ensure that intellectual property rights are respected throughout the development and use of AI-generated music. The project will establish clear guidelines for the ownership of AI-generated works, ensuring that composers retain rights over their original contributions, and that any collaborative outputs are properly attributed.

The project will adhere to the European Code of Conduct for Research Integrity, ensuring that all research activities are carried out with honesty, integrity, and accountability. This includes maintaining high standards in the documentation and dissemination of findings, as well as ensuring that all participants and collaborators are treated with respect and fairness.

The handling of research data will strictly adhere to the legal and ethical guidelines of the University of Siegen and the German Data Forum (RatSWD). This includes obtaining informed consent from all participants, ensuring the confidentiality and anonymity of personal data, and complying with the General Data Protection Regulation (GDPR). The project will undergo ethical review, and all data processing activities will be documented and approved by relevant institutional bodies. Regular ethics reviews will be conducted in collaboration with the host university's ethics committee to monitor adherence to these principles and address any ethical concerns that arise during the project.

National laws and regulations, particularly in Germany, where the project is based, will also be followed closely, including compliance with the German Federal Data Protection Act (BDSG) and Intellectual Property Law.

By adhering to these ethical principles and legal frameworks, the AI-ACT project aims to ensure that its research is conducted in a manner that is socially responsible, ethically sound, and legally compliant, contributing to the ongoing dialogue around the ethical development of artificial intelligence in creative industries.

Remaining characters   120

Application forms

Security issues table

1. EU Classified Information (EUCI)[2]			Page
Does this activity involve information and/or materials requiring protection against unauthorised disclosure (EUCI)?	○ Yes ● No		
Does this activity involve non-EU countries which need to have access to EUCI?	○ Yes ● No		

2. Misuse			Page
Does this activity have the potential for misuse of results?	○ Yes ● No		

3. Other Security Issues			Page
Does this activity involve information and/or materials subject to national security restrictions? If yes, please specify: (Maximum number of characters allowed: 1000)	○ Yes ● No		
Are there any other security issues that should be taken into consideration? If yes, please specify: (Maximum number of characters allowed: 1000)	○ Yes ● No		

Security self-assessment

Please specify: (Maximum number of characters allowed: 5000)

Remaining characters   5000

[2]According to the Commission Decision (EU, Euratom) 2015/444 of 13 March 2015 on the security rules for protecting EU classified information, "European Union classified information (EUCI) means any information or material designated by an EU security classification, the unauthorised disclosure of which could cause varying degrees of prejudice to the interests of the European Union or of one or more of the Member States".

[3]Classified background information is information that is already classified by a country and/or international organisation and/or the EU and is going to be used by the project. In this case, the project must have in advance the authorisation from the originator of the classified information, which is the entity (EU institution, EU Member State, third state or international organisation) under whose authority the classified information has been generated.

[4]EU classified foreground information is information (documents/deliverables/materials) planned to be generated by the project and that needs to be protected from unauthorised disclosure. The originator of the EUCI generated by the project is the European Commission.

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5 - Other questions

Academic data

PhD reference date	
Earliest date of PhD or equivalent - DD/MM/YYYY*	15/09/2021

Applicants holding a Medical degree	
Are you a medical doctor or do you hold a degree in medicine? Please note that if you have also been awarded a PhD, your medical degree may be your first eligible degree. (please see the ERC Information for Applicants to the Starting and Consolidator Grant for more details).	○ Yes ◉ No

Extension Requests	
With respect to the earliest date (PhD or equivalent), I request an extension of the eligibility window, (indicate number of days) [see the applicable ERC Work Programme and the Information for Applicants to the Starting and Consolidator Grant Call].	○ Yes ◉ No

Working time commitment	
Please indicate your percentage of working time in an EU Member State or Horizon Europe Associated Country over the period of the grant. Please note that you are expected to spend a minimum of 50% of your total working time in an EU Member State or Associated Country.*	100
Please indicate the % of working time you (as PI) will dedicate to the project over the period of the grant. Please note that PIs are expected to dedicate a minimum of working time to the project (30% for AdG, 40% for CoG and 50% for StG). The personnel cost for the PI provided in section "3-Budget" cannot be higher than the percentage indicated here. This information will be provided to the experts at Step 2 together with the section "3-Budget".*	50

ERC eligibility requirements	
Please acknowledge that you are aware of the eligibility requirements for applying for this ERC call as specified in the ERC Annual Work Programme, and please certify that, to the best of your knowledge your application is in compliance with all these requirements. Please note that your proposal may be declared ineligible at any point during the evaluation or granting process if it is found not to be compliant with these eligibility criteria.*	☒

Consent obtained from participants and researchers	
Please confirm that you (as PI) have the written consent of all participants on their involvement and the content of this proposal, as well as of any researcher mentioned in the proposal on their participation in the project (either as team member, collaborator, other PI or member of the advisory board). We may request you to provide proof of the written consent obtained at any time during the evaluation.*	☒

Sharing evaluation data	
If your proposal is not funded (due to budget limitations), do you consent to allow us to disclose the results of your evaluation (score and ranking range), together with your name (as PI), non-confidential proposal title, acronym, abstract and your/your host institution's contact details to national or regional public research funding authorities that run funding schemes specifically for ERC applicants that scored highly in the evaluation?	○ Yes ◉ No

Application forms

If your proposal is funded, do you consent to allow us to disclose your name (as PI), non-confidential proposal title, acronym, abstract and your/your host institution's contact details to institutions that are awarding prizes to excellent researchers?	⦿ Yes ◯ No

Application forms

Excluded Reviewers

You can provide up to three names of persons that should not act as an evaluator in the evaluation of the proposal for potential competitive reasons.

First Name	Luc
Last Name	Nijs
Institution	Ghent University; University of Luxembourg
Town	Esch-Belval Esch-sur-Alzette
Country	Luxembourg
Webpage	

First Name	Emily
Last Name	Howard
Institution	The Royal Northern College of Music
Town	Manchester
Country	United Kingdom
Webpage	

First Name	Georg
Last Name	Hajdu
Institution	Ligeti Center
Town	Hamburg
Country	Germany

Application forms

Proposal ID **101220792**
Acronym **AI-ACT**

Webpage	

ERC Starting Grant 2025
Research proposal [Part B1]

AI-Accelerated Creativity Theory: The Future of Music Composition with Generative Artificial Intelligence (AI-ACT)

Cover Page:
- Univ.-Jun.-Prof. Dr. Lawrence Wilde
- University of Siegen - Institute of Music at Faculty II: Education · Architecture · Arts
- 60 months

The rise of generative artificial intelligence (GenAI) in music presents transformative possibilities and significant challenges. While the technological and ethical implications of AI have garnered attention, its impact on human creativity and artistic processes remain underexplored. The AI-Accelerated Creativity Theory (AI-ACT) research project addresses these challenges with three key objectives. First, it will build Co-Composer (CoCo), a suite of GenAI Virtual Studio Technology (VST) tools that empower artists to train AI models on their own creative work, enabling personalized collaboration with AI beyond Big Data training and facilitating the development of the composer's unique artistic voice. Secondly, AI-ACT will establish a theoretical framework to empirically study human creativity with GenAI, focusing on what the project identifies as the 'paradox of acceleration' – the capacity of AI to accelerate and decelerate different stages of the creative process. Finally, the project will integrate the newly developed tools and theoretical framework through the composition and performance of original multimedia works utilizing CoCo and AI-ACT. These public concerts will be held (1) nationally in Germany, (2) within the European Union, and (3) internationally, expanding the project's research impact. AI-ACT adopts an innovative research approach in its interdisciplinary methodology, bridging Design-Based Research (DBR), Arts-Based Research (ABR), and qualitative methods to study the intersection of human creativity and AI in music composition. The Principal Investigator (PI), an experienced composer-researcher with expertise in music, digital technology, and transdisciplinary research, will lead the AI-ACT team, which includes two postdoctoral researchers, two PhD students, and one student assistant. The project will contribute to new knowledge in AI-music collaboration, shaping future creative practices and research methodologies.

A. Extended Synopsis of the Scientific Proposal

A.1 Ground-Breaking Nature of the Research Project

Generative Artificial Intelligence (GenAI) systems for music are rapidly advancing, providing composers with tools that transform the creative process (Mukherjee and Mulimani, 2022). State-of-the-art AI models, such as Generative Pre-training Transformers (GPTs), can generate music with a level of coherence and detail on par with human creativity (Guo et al., 2023). It is essential for researchers and practitioners to systematically investigate the impact of these technologies on compositional practices, ensuring a deeper understanding of their role in the future of music-making (Clester and Freeman, 2023).

My project has three key objectives: 1) **Build** Co-Composer (CoCo), a GenAI Virtual Studio Technology (VST) suite that composers can train using their own works; 2) **Establish** the AI-Accelerated Creativity Theory (AI-ACT) as an empirical framework for studying creativity with GenAI; and 3) **Compose and Present** original works using CoCo and the AI-ACT framework.

GenAI music composition can be advanced by developing innovative AI-driven VST plugins in collaboration with practicing composers. While progress has been made in generative music through machine and deep learning, current models are limited by their reliance on large datasets and struggle to capture artistic nuances of individual artists (Rohrmeier, 2022; Civit et al., 2022). To address these limitations, it is essential to explore novel approaches that allow composers to train GenAI systems on their own creative works, enabling greater control over the data and fostering a more personalized and innovative co-creative process (Gioti, 2021). This shift can empower composers to create truly original works with GenAI tools, moving beyond mere replication of established genres and styles.

The **AI-Accelerated Creativity Theory (AI-ACT)** research project will develop **Co-Composer (CoCo)**, a suite of GenAI VST plugins designed for use in industry-standard Digital Audio Workstations (DAWs). CoCo aims to adapt to the non-linear processes of music composition by learning and responding to the unique artistic intentions of composers (Zacharakis et al., 2021; Huang et al., 2020). Through an innovative research methodology that bridges Design-Based Research (DBR), Arts-Based Research (ABR) and qualitative methods, the project strives to deepen our understanding of creativity and Human-AI Interaction (HAI) in music-making processes (Born, 2021; Amabile, 2019).

GenAI tools offer new collaborative possibilities between human and machine (Déguernel et al., 2022; Antoniadis, 2023). The next frontier in Human-AI Interaction (HAI) involves refining these tools to engage in creative dialogues with composers, responding to artistic inputs and providing more personalized and context-aware responses. As this interaction deepens, new forms of artistic expression will emerge, challenging traditional notions of creativity, authorship, autonomy, and artistic agency (Ivcevic and Grandinetti, 2024; Boden, 2004).

A critical step in harnessing the potential of GenAI in music composition involves not only designing new tools but also **developing a theoretical framework** for studying human-GenAI interactions. AI-ACT will focus on how GenAI systems influence various stages of the creative process (Wallas, 2018). A key phenomenon identified by the research project is the '**paradox of acceleration**'—while GenAI can significantly speed up certain technical and creative processes, this acceleration may lead to cognitive overload, requiring composers to spend more time on reflection, decision-making, and critical assessment (Chernev et al., 2015; Rosa, 2013). AI-ACT aims to offer new workflow models that account for these dynamics, addressing acceleration and deceleration of various stages of the compositional processes (O'Toole and Horvát, 2024; Gabora, 2013; Boden, 1990; Cage, 1961).

The project draws on postdigital research, which explores the hybridization of digital and analog elements and the fluid relationships between humans and machines (Jandrić, 2023; Cascone, 2000). While postdigital literature acknowledges hybrid creative processes, a framework that fully addresses the complexities of GenAI in music has yet to be developed—a gap that AI-ACT aims to fill.

My work as a composer and researcher focuses on how digital and AI tools shape creative practices in music composition and education (Wilde et al., 2024; Wilde and White, 2024, 2024). My research through the Postdigital Laptop Ensemble (PULSE) at the University of Siegen has revealed both the opportunities and challenges that GenAI presents to creative workflows. GenAI complicates traditional stages of the creative process—*preparation*, *incubation*, *illumination*, and *verification* as described by Wallas (2018)— and disrupts conventional notions of agency and autonomy (Bandura, 2006, 2001, 1986; Emirbayer & Mische, 1998). This led me to the develop of the concept of "Postdigital Resonance," which expands Rosa's (2019) axes of resonance by incorporating a *postdigital* dimension (Wilde et al., 2024). These findings form the foundation of my ongoing research, which focuses the long-term implications of technology on human creativity.

A.1.1   Training GenAI Models with Composers' Works: Implications for Music Composition Processes

In current GenAI music systems, models are typically trained on large datasets composed of pre-existing works from various artists and genres, this often limits their ability to capture the nuanced intent of individual composers (Déguernel et al., 2022; Morreale et al., 2023). AI-ACT proposes the development of a composer/performer-centric GenAI VST plugin suite (CoCo), designed to learn from the unique characteristics of a composer's body of work (e.g., harmonic language, formal structure, orchestration, among others) fostering a more intimate collaboration with AI systems (Avdeeff, 2019). By moving beyond traditional Big Data approaches, CoCo will be able to adapt to individual creative processes, aligning the GenAI output more closely with the artist's creative vision.

Most AI music generation systems today rely on Recurrent Neural Networks (RNNs), Generative Adversarial Networks (GANs), and Variational Autoencoders (VAEs) (Roberts et al., 2018; Dong et al., 2018; Liu and Yang, 2018; Yang et al., 2017). However, these systems often reflect biases inherent in their training datasets, such as Lakh MIDI[1] and Maestro[2], leading to outputs that mirror specific genres even when the models were not explicitly designed for such replication (Spiekermann and Dethmann, 2024; Civit et al., 2022). This project aims to overcome these limitations by developing composer/performer-centric models that learn directly from individual creative data, enabling more personalized and versatile GenAI tools aligned with the artist's unique voice.

Although RNNs, GANs, and VAEs are widely used, they often struggle to maintain long-term thematic coherence, resulting in generated music that lacks large-scale structure (Chen et al., 2024). In contrast, Long Short-Term Memory (LSTM) networks have demonstrated the ability to retain long-term dependencies essential for musical continuity, effectively capturing and reproducing chord progressions and melodic structures (Chu et al., 2016; Eck and Schmidhuber, 2002; Hadjeres et al., 2016). This project aims to leverage LSTM networks and other advanced models to develop CoCo, enabling the generation of music that maintains long-term coherence and adapts to individual compositional processes.

A significant challenge in current GenAI tools for music composition is their lack of integration with professional environments like Digital Audio Workstations (DAWs), which limits their practical usability for composers and musicians. Although some tools, such as Google's Magenta[3] and DeepBach[4], have been integrated into DAWs, most remain standalone applications or web-based platforms, constraining their use in professional contexts (Civit et al., 2022). This project addresses these gaps by developing CoCo as an intuitive interface that enables co-collaboration in music composition, aligning GenAI outputs with the composer's emotional and creative intentions (Williams and Lee, 2018; Juslin and Sloboda, 2001).

Human-computer co-creativity, in which GenAI systems engage in a reciprocal relationship with the composer, plays a crucial role in expanding the space of creative possibilities (Gioti, 2021). Rather than functioning autonomously, these systems work alongside humans, enhancing the composer's artistic intent and introducing novel pathways for creative exploration.

The concept of human-machine co-agency suggests that machines are not passive tools but active participants in the creative process, co-producing musical works in collaboration with human composers (Rutz, 2021). This notion of hybrid agency challenges traditional ideas of artistic expression and authorship, paralleling Barad's (2007) concept of co-produced phenomena in scientific experimentation, where both the observer and the apparatus generate the outcome. As GenAI systems continue to dissolve the line between composer and tool, the resulting works represent novel forms of human-machine collaboration. Composers utilizing these systems are not merely adopting new tools; rather, they are engaging in a broader socio-technical shift characterized by complex interactions between human and machine creativity.

A.1.2   AI-Accelerated Creativity Theory (AI-ACT) and the Postdigital

The AI-ACT project draws on postdigital research, which examines the entangled relationships between analog and digital processes, challenging binary distinctions in creative practices (Knox, 2024; Carvalho and Freeman, 2023; Fawns, 2022). By leveraging postdigital frameworks, AI-ACT examines how GenAI tools operate not as mere technical extensions, but as active participants in a co-creative process (Peters et al., 2024).

Postdigital aesthetics further offer a framework for understanding the evolving relationship between artistic practices and digital technologies (Berry and Dieter, 2015). The postdigital reflects how deeply these

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[1] https://colinraffel.com/projects/lmd/
[2] https://magenta.tensorflow.org/datasets/maestro
[3] https://magenta.tensorflow.org/
[4] https://github.com/Ghadjeres/DeepBach

technologies have permeated society and culture, influencing artistic production in profound ways (Jandrić, 2023). The integration of digital tools like DAWs, VST plugins, and GenAI has fundamentally transformed the compositional process, embedding these technologies within the creative act itself (Giddings, 2022). This reflects the postdigital condition, where digital technologies are no longer seen as disruptive but have become normalized aspects of creative practice (Berry and Dieter, 2015).

A key theme in postdigital arts research is aesthetic convergence, where traditional techniques merge with digital processes to create hybrid forms that challenge medium specificity (Paul and Levy, 2015). In music composition, this convergence is evident in the use of GenAI-driven tools that collaborate with human creativity, blurring the boundaries between composer and tool in co-creative processes.

Computational rationality is yet another critical aspect of GenAI music composition, reshaping the practice by introducing algorithmic logic into the creative process (Berry and Dieter, 2015; Berry, 2015). For composers working with GenAI, this logic is defined by the data these systems are trained on and the parameters set during composition. While GenAI offers new creative possibilities, it also raises ethical concerns about authorship, intellectual property, and the commodification of artistic output (Giambastiani, 2021). The postdigital condition demands that composers critically engage with these technologies, recognizing their role in shaping future creative practices.

AI-ACT offers a framework for understanding the impact of GenAI on human creativity, postulating the '**paradox of acceleration,**' wherein the increased speed of production can result in cognitive overload, necessitating additional time for reflection and decision-making. AI-ACT posits that GenAI tools impact human creativity not only by increasing output speed but by fundamentally changing how composers conceptualize and engage with their creative work.

A crucial goal is to understand how GenAI impacts the different stages of human creativity, particularly in relation to Wallas's (2018) four-stage model: *preparation*, *incubation*, *illumination*, and *verification*. GenAI complicates each of these stages, either accelerating or decelerating various aspects of the composer's workflow. In the **preparation** stage, variations and suggestions are quickly generated, enabling composers to explore new possibilities more rapidly, though this may reduce time for thoughtful engagement with source material. GenAI can further complicate the **incubation** stage, potentially disrupting the subconscious processing that is essential for creative breakthroughs. During the **illumination** stage, the constant flow of AI-generated material can overshadow spontaneous creative insights, making it difficult to distinguish between authentic moments of personal inspiration and machine-generated outputs, thereby complicating the composer's sense of creative agency. Lastly, in the **verification** stage, while GenAI offers immediate feedback, the abundance of possibilities may slow down the critical evaluation process, complicating the task of selecting the most meaningful elements.

With the aim of investigating the 'paradox of acceleration,' AI-ACT draws on Rosa's theory of Social Acceleration (2013), specifically focusing on the concept of *technological acceleration*. Rosa's notion of the "frenetic standstill," where increased speed paradoxically leads to a state of stasis, reflects the 'paradox of acceleration' in the creative process involving GenAI. While these tools enable faster music generation, they risk diminishing the reflective depth necessary for genuine artistic expression and slowing down key stages in creativity due to the vast amount of material produced. AI-ACT seeks to address this by studying how composers can best integrate GenAI into their workflows (Lijster, 2018).

A.2   Methodology

A.2.1   WP1: Build Co-Composer (CoCo) VST Plugin Suite for Music Composition

This work package focuses on developing and releasing Co-Composer (CoCo), a GenAI Virtual Studio Technology (VST) plugin suite for music composition. CoCo will allow composers to train AI models using their own creative data (e.g., scores, audio files, MIDI), enabling personalized and real-time collaboration. The iterative design process, grounded in Design-Based Research (DBR) and Arts-Based Research (ABR), will ensure CoCo aligns with the dynamic, non-linear workflows of composers. Key phases include: (1) **Requirement Gathering and Conceptual Design -** engaging with composers to identify tool functionalities, ensuring integration into DAWs; (2) **Prototype Development -** Building initial AI-driven models (e.g., LSTM, VAEs) for real-time interaction; (3) **Beta Testing -** Collecting feedback from professional composers to refine usability and creative impact; (4) **Final Development and Optimization:** Addressing usability, ensuring thematic coherence in music generation, and resolving data ownership and intellectual property concerns; and (5) **Open-Source Launch and Dissemination:** Releasing CoCo with documentation, articles, and workshops for widespread use and research. WP1 will deliver a robust, flexible, and user-friendly VST suite, promoting personalized GenAI-driven composition practices.

A.2.2   WP2: AI-Accelerated Creativity Theory (AI-ACT) Development

WP2 focuses on developing the AI-Accelerated Creativity Theory (AI-ACT) to systematically study how generative AI (GenAI) influences the creative process. The project will explore the paradox of acceleration—how GenAI can both accelerate and decelerate stages of creativity—using Arts-Based Research (ABR) and qualitative methodologies. Key phases include: (1) **Literature Review**: Reviewing creativity models and theories of acceleration to identify gaps and set theoretical foundations; (2) **Empirical Studies**: Collecting data from professional composers using the CoCo VST suite to study Human-AI (HAI) collaboration; (3) **Framework Development**: Analyzing data to formalize the AI-ACT framework and model co-creativity dynamics; and (4) **Validation and Dissemination**: Refining the framework through workshops and focus groups, publishing findings, and presenting AI-ACT at international conferences. WP2 ensures the rigorous development, validation, and dissemination of AI-ACT across diverse artistic contexts.

A.2.3   WP3: Composition and Performance of Original Works Using CoCo and AI-ACT

WP3 focuses on the practical application of the Co-Composer (CoCo) VST suite and the AI-Accelerated Creativity Theory (AI-ACT) framework to compose, present, and analyze original music. Through **Arts-Based Research (ABR)**, musicians and ensembles in residence will collaborate with composers to perform and record these works, offering real-world testing and refinement of CoCo and AI-ACT. The work package is divided into three key phases: (1) **Concert I (National)**: The first set of compositions will be created and performed at the University of Siegen, Germany, testing early prototypes and collecting feedback for refinement; (2) **Concert II (European)**: More complex works will be presented at a European venue, gathering critical insights from a wider audience; and (3) **Concert III (International)**: The final concert will be held internationally at venues such as the International Computer Music Conference or the Center for Creative Technology at The Juilliard School, showcasing the fully developed CoCo VST and AI-ACT. WP3 will expand the project's visibility through national, European, and international performances, fostering collaboration and refining both the technological tools and theoretical framework.

A.3   Research Team

The success of this five-year project relies on an interdisciplinary team, including a Principal Investigator (PI), two postdoctoral researchers (Postdocs), two PhD students, and a student assistant. Each member will contribute specific expertise across the project's three work packages: (1) development of the CoCo VST suite (WP1), (2) establishment of the AI-Accelerated Creativity Theory (AI-ACT) (WP2), and (3) composition and performance of original works (WP3).

Principal Investigator (PI): I will provide overall leadership, guiding the development of the Co-Composer (CoCo) VST suite and AI-ACT framework while ensuring the project's success. I will supervise the entire team, manage the interdisciplinary collaboration, oversee ethical concerns such as data ownership, and lead dissemination efforts, including publications, conference presentations, and workshops. My experience in music composition and technology will ensure the project meets its objectives within timelines and budgets.

Postdoctoral Researcher 1 (Postdoc 1): Specializing in AI systems and VST development, this postdoc, starting in month 7, will design and test the CoCo VST suite, developing machine learning models for integration into music composition tools. They will lead prototype development, beta testing, and contribute to AI-ACT's theoretical advancement, working closely with the PhD students and the entire team to refine the tools.

Postdoctoral Researcher 2 (Postdoc 2): Starting in month 25, Postdoc 2 will finalize CoCo's development, focusing on performance optimization and integration with industry-standard software. They will collaborate with Postdoc 1 to ensure a seamless transition and prepare CoCo for open-source release, addressing usability, ethical concerns, and dissemination through publications and conferences.

PhD Student 1 (Popular Music Focus): This PhD student will start in month 7 and will focus on popular music composition, using CoCo to explore how AI tools can enhance creative workflows. They will compose original works, document their experiences, and contribute to the AI-ACT framework through Arts-Based Research (ABR).

PhD Student 2 (Concert Music Focus): Joining in month 19, this student will specialize in contemporary concert music. They will use CoCo in concert music settings to explore AI's role in both acoustic and electronic performance, contributing valuable insights into the AI-ACT framework and creating original compositions for national and international platforms.

Student Assistant: The assistant will provide logistical and administrative support, managing workshops, composer interviews, data collection, and aiding in the organization of public concerts. They will also assist in preparing materials for CoCo's open-source release, including user guides and tutorials, while managing the project's online presence.

A.4   Evaluation of Risk

AI-ACT presents both significant opportunities and challenges, positioning it as a high-risk, high-reward project. While ambitious, the project team is well-prepared to tackle these challenges. I bring extensive experience in technology-mediated composition and leading interdisciplinary projects, while the carefully selected team offers a diverse range of expertise to ensure the project's success. Each of the three work packages introduces critical risks that the team will address through carefully defined mitigation strategies, contingency plans and milestones for each workpackage.

For **WP1**, a primary risk lies in data scarcity and quality. Individual composers may lack sufficient volumes of work to train effective AI models. Even when using formats like scores, audio files, or MIDI, the data may not fully capture the complexity and diversity needed for robust AI training. Additionally, variations in data quality may hinder model effectiveness by failing to provide the detailed information required for learning intricate musical nuances (Gioti, 2021). Another challenge is the computational demands of training models on personalized datasets. AI-powered VSTs can strain DAWs, potentially leading to increased latency, slower performance, or even system crashes, particularly when handling complex projects or real-time processing. There is also a risk of over-specialization, where models trained on a single composer's work may become too narrow, limiting their adaptability and creative potential.

In **WP2**, developing the AI-Accelerated Creativity Theory (AI-ACT) involves the risk of dilution of the framework through the integration of numerous theoretical constructs on creativity, given the breadth of existing research. To mitigate this, the framework will prioritize the creative process itself, viewing all outputs—whether human or AI-generated—as part of a creative act. Additionally, Arts-Based Research (ABR) methodologies will provide rich, qualitative data from diverse artistic practices, offering empirical support for the theoretical framework.

For **WP3**, both artistic and ethical concerns emerge, such as the potential over-automation of the creative process, which could diminish the human role, and intellectual property ownership of AI-generated outputs. For PhD students working in popular and contemporary concert music, there is a risk that their compositions may blur the lines of creative agency, either through over-reliance on or under-utilization of AI tools, raising questions about artistic validity and autonomy. Models trained exclusively on individual works may also lack the versatility to inspire new creative directions, limiting the potential for breakthroughs (Boden, 2004). Addressing these risks will be essential to realizing the transformative potential of the project.

A.5   Impact

The development of the **AI-Accelerated Creativity Theory (AI-ACT)**, alongside **Co-Composer (CoCo)**, will provide a comprehensive framework and set of tools for understanding how AI systems influence human creativity in the age of AI. This theoretical and practical contribution has the potential to inform not only future AI research in music but also AI applications in other fields. The **Co-Composer (CoCo)** Virtual Studio Technology (VST) plugin suite developed through this project holds potential to impact the fields of music composition, AI research, and creative industries. By providing composers with tools that integrate personalized AI collaboration, CoCo can revolutionize the way composers interact with GenAI. The artistic works created by students and composers using the Co-Composer (CoCo) VST suite will serve as impactful demonstrations of Human-AI (HAI) collaboration in music, showcasing the potential of AI to enhance and expand creative expression across genres. These compositions, performed at national and international venues, will not only elevate the project's visibility but also provide tangible examples of AI-augmented creativity, influencing future artistic and academic discourse. Through its ground-breaking integration of theory, technology, and artistic practice, AI-ACT has the potential to redefine the future of creativity, setting a new paradigm for Human-AI (HAI) collaboration that resonates far beyond the realm of music, influencing the evolution of creative expression across artistic and technological domains.

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B.	**Curriculum vitae and Track Record**

B.1	**Personal Details**

Family name, First name: **Wilde, Lawrence**
Researcher unique identifier (ORCID): 0009-0005-7198-9527
URL for web site: https://www.musik.uni-siegen.de/mitarbeiter/professoren/wilde/?lang=de

Education

01/11/2021	Doctor of Philosophy (Ph.D.)
	Princeton University, Department of Music, NJ, USA
	<u>Dr. Steven Mackey, Professor of Music; Director of Graduate Studies (Composition)</u>
2016	Master of Fine Arts (M.F.A.)
	Princeton University, Department of Music, NJ, USA
2014	Bachelor of Music (B.M.)
	The Juilliard School, NY, USA

Current Position

2023 – present	Junior Professor for Composition and Music Theory in Postdigital Educational Spaces
	University of Siegen, Institute of Music at Faculty II: Education · Architecture · Arts, Germany

Previous Positions

2014 – 2021	Teaching Assistant
	Princeton University, Department of Music, NJ, USA
2009 – 2014	Teaching Fellow
	The Juilliard School, Department of Music Theory and Composition, NY, USA

B.2	**Research Achievements and Peer Recognition**

Research Achievements

I have composed over 33 published and internationally performed original works, spanning acoustic, electro-acoustic, and electronic multimedia compositions. These works have been commissioned and performed by leading ensembles, such as the Kronos Quartet, Eighth Blackbird, JACK Quartet, So Percussion, Tesla Quartet, Ensemble Mise-En, ÆON Ensemble, and Variant 6. My compositions have been described as "passionate and dramatically contoured" by *The New York Times*. Beyond composition, I have written academic papers published in Q1 journals and presented research at leading international computer music conferences. In addition to my creative output, I have held research and teaching fellowships at institutions such as Princeton University and The Juilliard School. My compositional work has been supported by fellowships at Tanglewood, the Aspen Music Festival, and the Bang On A Can Music Festival, and my works have been presented at venues like Carnegie Hall, Lincoln Center, and internationally at festivals such as Cabrillo Festival of Contemporary Music and Centro Nacional de Difusión Musical. Below, I present ten of my most significant works, with a brief discussion of each.

1. **Wilde, L**., White, C., & Jandrić, P. (2024). Postdigital resonance. *Postdigital Science and Education*. https://doi.org/10.1007/s42438-024-00516-x.

   This paper offers an examination of how digital technologies are reshaping human experiences, proposing the addition of a *postdigital axes of resonance* as an expansion to Hartmut Rosa's theory of resonance. As the main author, I contextualized this concept within contemporary digital culture, demonstrating how digital technologies mediate and fragment individuals' connections to the world. This work provides a critical framework for my proposed research project, emphasizing the intersection of human creativity and technology.

2. **Wilde, L.**, & White, C. (2024). TABstaff+: A Hybrid Music Notation System for Grid-Based Tangible User Interfaces (TUIs) and Graphical User Interfaces (GUIs). *Ninth International Conference on Technologies for Music Notation and Representation*. 2024. Institute for Computer Music and Sound Technology (ICST) at Zurich University of the Arts. *Zenodo*, https://doi.org/10.5281/zenodo.13144433.

    This paper introduces a novel approach to music notation for grid-based musical interfaces like the Ableton Push[5], designed to bridge traditional and digital music education. As the primary author, I developed the TABstaff+ system, which integrates traditional staff notation, tablature, and chord diagrams to create a versatile tool for teaching, composing, and performing music with TUIs and GUIs. This work is directly relevant to my proposed research, as it demonstrates how digital technologies can reshape compositional practices, highlighting my ability to innovate at the intersection of human-computer interaction (HCI) and music composition.

3. White, C., & **Wilde, L.** (2024). A Resonant Learning (RL) Framework. *Education Quarterly Reviews*, *7*(3). https://doi.org/10.31014/aior.1993.07.03.597.

    This paper applies Hartmut Rosa's theory of resonance and Graham Wallas' creative process to postdigital educational spaces, offering an innovative approach to teacher education. As co-author, I contributed to the development of the RL framework, emphasizing the integration of creativity, technology, and resonant learning experiences, particularly within technology-mediated music composition. This work is directly relevant to my proposed research, as it explores how digital technologies influence creativity and learning.

4. **Wilde, L.** (2023). *Post-agency: Understanding the Effects of Artificial Intelligence (AI) on Student and Teacher Agency in Postdigital Educational Spaces.* LuxERA – Luxembourg Educational Research Association, University of Luxembourg.

    This paper critically investigates how AI influences the autonomy and decision-making processes of both students and teachers, emphasizing the concept of *post-agency*, which I developed to highlight the intertwined relationship between human agency and machine-driven processes in postdigital classrooms. It argues that AI systems, rather than being neutral tools, actively shape learning and teaching practices, often altering individual agency within educational spaces. The insights gained from this work directly support my proposed research on AI's role in creative processes, providing a framework for examining how AI functions as both a tool and collaborator.

5. **Wilde, L.** (2024). *Postdigital Spaces for Music Education: Empirical Insights from the PULSE Laptop Ensemble Project.* Symposium: Contours of a Postdigital Music Education, University of Education Freiburg & Freiburg University of Music.

    The paper provides an overview of the Post-digital Laptop Ensemble at the University of Siegen (PULSE)[6], a technology-mediated new music ensemble for music teacher training. As the founding director, I designed this innovative platform to investigate the sociomateriality of musical practice and to develop new postdigital pedagogical formats. The project, relevant to my proposed research, provides empirical insights into how digital technologies influence music education, highlighting themes of creativity, agency, and empowerment, while demonstrating my capacity to lead interdisciplinary research aligned with the project's goals.

6. **Wilde, L.** (2014/20). *String Quartet No. 2 'Speak, Time'* [Musical composition]. New York, NY. American Society of Composers, Authors and Publishers (ASCAP), SoundInk Publishing.

    This composition was commissioned and premiered by the Kronos Quartet. For this work, I developed custom Max MSP patches and utilized the SuperCollider programming language, integrating Markov chains to generate and manipulate musical material, which was subsequently transcribed for acoustic string instruments. My compositional process involved the use of machine learning algorithms and Markov chain-driven systems to generate and refine harmonic progressions

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[5] https://www.ableton.com/en/push/
[6] https://www.youtube.com/@PULSELaptopEnsemble

and rhythmic material. This composition is directly relevant to my proposed research, as it demonstrates my capacity to conduct high-level practice-based research and explore the intersection between human creativity and artificial intelligence in music-making.

7. **Wilde, L.** (2017). Transverse Lines [Musical Composition]. New York, NY. American Society of Composers, Authors and Publishers (ASCAP), SoundInk Publishing.

   This composition was created for the ensemble Eighth Blackbird using an embodied music composition method. I employed Max MSP software to utilize the computer's camera for tracking my body movements, mapping gestures to various aspects of the music generation process. The gestural data was captured and transferred into MIDI information, which I recorded in Ableton Live and processed in musical notation software for the live musicians. Each thematic fragment for the ensemble's members was derived from the interaction between the body and the camera, resulting in a unique integration of physical movement and digital composition.

8. **Wilde, L.** (2022). *String Quartet No. 3* [Musical composition]. New York, NY. American Society of Composers, Authors and Publishers (ASCAP), SoundInk Publishing.

   This is a multimedia, transdisciplinary composition commissioned by The Juilliard School Center for Creative Technology. The work integrates live instrumental performance, dance, and digital media. It features an amplified string quartet, a dancer controlling live electronics via a Nintendo Wii controller programmed in SuperCollider, and algorithmically generated visuals. By allowing the dancer to shape the electronic soundscape in real time, the work explores how technology can extend the expressive capabilities of the human body, creating an intimate connection between movement and sound. This composition is directly relevant to my proposed research, exemplifying how digital technologies can reshape artistic expression and challenging traditional boundaries in music composition and performance.

9. White, C., & **Wilde, L.** (2024). *Com(P)unication: Computer-mediated interaction and postdigital embodiment*. https://doi.org/10.13140/RG.2.2.30526.29766.

   This multimedia composition explores the relationship between human agency, computer interaction, and postdigital embodiment. In this work two computers interact via a video conferencing setup, guided by a blindfolded performer, blending acoustic feedback and computer-generated sounds to blur the lines between digital and physical spaces. This composition examines how technology shapes embodied experiences, contributing to the discourse on postdigitality in music and challenging conventional notions of human-computer interaction.

10. **Wilde, L.**, & White, C. (2024). *(A)Synchrony: An interactive installation exploring video-streaming platform playlists and videos as musical 'sketches'*. https://doi.org/10.13140/RG.2.2.11691.25128.

    This interactive installation represents an artistic research project that investigates the potential of video-streaming platform playlists and videos to serve as musical 'sketches,' transforming everyday digital interactions into creative outputs. Algorithmically generated MIDI fragments were realized through the use of advanced Virtual Studio Technology (VST) instruments. In my role as co-composer, I developed an immersive audiovisual environment, enabling participants to engage with videos from a curated playlist. The installation evolves through collective creativity, prompting a re-evaluation of traditional notions of musical form and authorship. This project highlights my ability to merge practice-based research with theoretical inquiry, specifically examining the ways in which digital technologies influence artistic production and audience engagement.

Peer Recognition

From 2024, I have been a Young Academy for Sustainability (YAS) Research Fellow at the Freiburg Institute for Advanced Studies (FRIAS), University of Freiburg, Germany, where my research focuses on the intersection of music, AI, and sustainability in postdigital creative practices. My academic trajectory includes artistic-research fellowships, including the 2021 Tanglewood Music Festival Composition Fellowship and the 2018 Fulbright-Hays Doctoral Dissertation Research Abroad Fellowship, which enabled me to conduct research at the Royal College of Music (KMH) in Stockholm, Sweden. Earlier, I was awarded the 2014 Paul

& Daisy Soros Fellowship for New Americans for my doctoral research at Princeton University, further solidifying my interdisciplinary approach to music composition with digital technology.

Throughout my career, I have been invited to give presentations at leading international conferences and institutions. Below is a selection of recent engagements:

- 2022: Princeton University Nassau Hall Society Conference, Stockholm, Sweden, where I presented work on postdigital composition during the celebration of new institutional partnerships with Stockholm University, the Royal Academy of Sciences, and the Norwegian Nobel Committee.

- 2021: Tanglewood Music Festival, Music Composition Fellowship, where I gave a presentation on using machine and deep learning for exploring new harmonic systems.

- 2019: Guest lecture at the Royal Academy of Music (KMH), Stockholm, exploring human-AI interaction in the compositional process.

These fellowships and presentations reflect my active role in the international discourse on music technology, composition with AI, and postdigital creativity.

B.3	Additional Information

Other Contributions to the Research Community

I have organized and led several interdisciplinary projects and initiatives that bridge music, technology, and environmental awareness. I co-led the CityGram and NoiseGate projects with New York University's Music Technology and Composition programs, focusing on raising awareness about urban and environmental noise pollution. I have also served as a reviewer and committee panelist for the international NoiseGate festival, evaluating proposals for exhibits, presentations, and performances. I am regularly invited to review for international journals and conferences in music technology and composition. In 2014, I founded the ÆON Music Ensemble, a 501(c)(3) non-profit dedicated to interdisciplinary and technology-mediated performances. With support from the United Nations Sustainable Development Solutions Network (UN SDSN) and Columbia University's Earth Institute, I launched *Music for a Sustainable Planet*, an educational concert series exploring the connection between music and science. The inaugural concert featured the Kronos Quartet and was part of the UN SDSN conference, with subsequent performances featuring renowned artists such as Yo-Yo Ma.

ERC Starting Grant 2025 [Part B2]

AI-Accelerated Creativity Theory: The Future of Music Composition with Generative Artificial Intelligence (AI-ACT)

A.   State-of-the-Art and Objectives

We are in a new age of music composition with digital technology. Generative AI (GenAI) systems are rapidly advancing, providing composers with tools capable of transforming the creative process and producing complex compositions across styles and genres (Mukherjee and Mulimani, 2022). State-of-the-art GenAI models, such as Generative Pre-training Transformers (GPTs), can generate music with a level of detail and coherence on par with human creativity (Guo et al., 2023). Developments in real-time interaction with GenAI tools enable composers to engage with these systems in increasingly sophisticated ways (Miranda, 2021). As researchers and practitioners in the field, it is our responsibility to understand the implications of these emerging technologies in music and systematically investigate how they impact the **creative process** in music composition (Clester and Freeman, 2023; Tsao, 2020). This will help us better understand the intersection of human and machine creativity in the future of music-making.

My project has three primary objectives:

1) **Build Co-Composer (CoCo)**, a composer/performer-centric GenAI Virtual Studio Technology (VST) suite for music composition, capable of being trained on composers' own works.
2) **Establish the AI-Accelerated Creativity Theory (AI-ACT)**, an empirically grounded framework for studying creativity with GenAI.
3) **Compose and Present** original compositions utilizing CoCo and the AI-ACT framework.

The study of GenAI's role in music composition can be facilitated by developing and applying **new GenAI Virtual Studio Technology (VST) plugin tools**, using **Arts-Based Research (ABR)** conducted with composers. Significant progress has been made in generative music using machine and deep learning (Rohrmeier, 2022). Current models are capable of replicating intricate musical patterns and forms, enabling them to generate highly complex music (Briot et al., 2020). While GenAI has been remarkably successful in generating music, it is not without limitations. As the field of composition evolves, it is clear that current GenAI models must extend beyond simply replicating established musical patterns and styles. Traditional models, even the most advanced, are often constrained by their dependence on large, pre-existing datasets and struggle to capture the full spectrum of artistic nuances that define truly *original, emotional* and *creative* musical works (Civit et al., 2022). To move beyond these limitations, we must explore more new approaches that empower composers by giving them control over the data, allowing for the use of their *own* creative works (e.g., scores, audio files, MIDI, and other formats) for training GenAI composition tools (Gioti, 2021).

The AI-ACT project will develop **Co-Composer (CoCo)**, a suite of GenAI VST plugins for use in industry-standard Digital Audio Workstations (DAWs). CoCo aims to be adaptable to the dynamic, non-linear processes of music composition, with the capacity to co-create by learning unique intentions and artistic insights of composers (Zacharakis et al., 2021; Huang et al., 2020). The AI-ACT research team (principle investigator, two Postdocs, two PhD students, and one student assistant) will develop and test CoCo through **Design-Based Research (DBR)** and **Arts-Based-Research (ABR)** (Born, 2021). The CoCo suite will be released as open-source software for public use and further research. By developing, studying and releasing CoCo, the project aims to further our understanding of creativity and Human-AI Interaction (HAI) in music-making processes (Dörfler, 2020; Amabile, 2019).

Unlike conventional digital tools for music (e.g., DAW plugins and sample-based instruments), GenAI offers greater collaborative possibilities between human and machine (Déguernel et al., 2022; Antoniadis, 2023). The next frontier in HAI and music lies in refining the relationship where GenAI tools not only generate material from existing data but also engage in creative dialogue with creators, responding to subtle artistic inputs. Although current GenAI technologies can generate complex musical material, future iterations

must focus on more personalized, context-aware responses that align with composers' creative processes. As the interaction between human and GenAI becomes increasingly intertwined, new forms of artistic expression are emerging, challenging traditional understandings of creativity (Ivcevic and Grandinetti, 2024; Boden, 2004; Feldman, 1999; Csikszentmihalyi, 1996, 1999).

A critical step in understanding and harnessing the potential of GenAI in music composition is not only the design and testing of new tools but also the development of a comprehensive theoretical framework to study these new interactions. The **AI-Accelerated Creativity Theory (AI-ACT)** aims to describe the dynamics between human creativity and GenAI systems, particularly how they influence and either accelerate or decelerate various stages of the creative process. While GenAI tools provide significant advancements, their ability to accelerate the creative process can paradoxically slow down key stages, such as reflection and critical evaluation, a phenomenon the research team identifies as the '**paradox of acceleration**.' The rapid generation of material can overwhelm composers, making it difficult to fully engage in deep, thoughtful decision-making, thereby decelerating key stages of the creative process (Wallas, 2018). AI-ACT aims to address these complexities by offering a comprehensive theoretical framework for investigating different phases of creativity with GenAI. This framework will not only explore how GenAI accelerates compositional processes but also offer **new workflow models** that account for the 'paradox of acceleration' and its impact on the cognitive processes required for meaningful artistic outcomes. (Gabora, 2013; Boden, 1990). Although the field of HAI in music is advancing rapidly, the intricacies of how these systems influence the full spectrum of the creative process remain underexplored.

These complex processes are characteristic of **postdigital music practices**, which are defined by the hybridization of digital and analog elements (Cascone, 2000). Music created with GenAI parallels **postdigital aesthetics**, where artistic agency and machine collaboration coexist in fluid, dynamic relationships. Although postdigital literature offers a rich background for exploring hybrid creative processes, it has yet to provide a framework that fully accounts for the complexities of GenAI in music. AI-ACT aims to bridge this gap by developing new models that capture the evolving dynamics of HAI collaboration in music-making.

Many VSTs for composition today rely heavily on randomization techniques for transforming and generating musical ideas. Moreover, most existing GenAI tools are limited to web-based platforms or standalone applications and cannot yet be integrated into industry-standard DAWs or music notation software. Additionally, the few AI-based VST plugins that *are* available focus on music production tasks such as mixing and mastering (e.g., Ozone 11[1] and Landr[2]) rather than music generation (Deruty et al., 2022). In addition, leading platforms like Suno and Udio – considered at the forefront of GenAI music – have admitted to training their systems on unlicensed music, raising significant issues around authorship, consent, and intellectual property. Latest AI VST tools, such as Lemonaide[3], come as pre-trained systems, offering no option for composers to train the GenAI on their own creative data. These limitations underscore the need for more **robust**, **ethically sound**, and **composer/performer-centric** GenAI tools that go beyond surface-level control to become integral to the creative process itself. A central question driving AI-ACT is: **How can we develop human-centric, ethically grounded AI tools that enhance the creative process?** This question has far-reaching implications, not just for music composition, but for other artistic fields and the development of GenAI in other domains (Peters et al., 2024).

For the past decade, my work as a composer, educator, and researcher has been driven by a central issue: how digital and AI tools shape creative practices in music and education. This question has guided my research in technology-mediated music composition and performance, culminating in the founding of the Postdigital Laptop Ensemble (PULSE) at the University of Siegen. Through PULSE, I have observed firsthand how digital technologies and GenAI influence students' creative workflows, revealing both opportunities and challenges. My work with the ensemble, along with my doctoral research at Princeton University, has consistently centered on postdigital music practices. The insights I gained through PULSE led to my paper, 'Understanding the Impact of AI in Education (AIED) on Student and Teacher Agency through Post-digital Educational Spaces,' which I presented at the 2023 LuxERA Emerging Researchers' Conference. Through my work, I found that GenAI complicates the stages of the creative process—*preparation*, *incubation*, *illumination*, and *verification*—and disrupts traditional notions of agency and autonomy (Wallas, 2018; Bandura, 2006, 2001, 1986; Emirbayer & Mische, 1998). This led me to develop the concept of 'Postdigital Resonance,' expanding Rosa's (2019) axes of resonance—social, material, and existential—by incorporating a postdigital dimension (Wilde et al., 2024). Together with the Resonant

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[1] https://www.izotope.com/en/products/ozone.html
[2] https://www.landr.com/
[3] https://www.lemonaide.ai/

Learning (RL) framework, which I proposed to better understand the emergence of creativity in technology-mediated educational environments, these concepts serve as the foundation of my ongoing research (White and Wilde, 2024). However, key questions remain: **What are the long-term implications of GenAI on human creativity, which tools can best integrate into creative workflows without undermining the creator's sense of agency, and can it facilitate the formation of a composer's own voice?** Answering these questions is crucial not only for shaping the future of music composition but also for advancing the broader development and ethical integration of GenAI systems across diciplines.

A.1   State-of-the-Art

A.1.1   Beyond Big Data: Training GenAI Models on Composers' Own Works

In current GenAI music systems, models are typically trained on large datasets consisting of pre-existing works from various artists and genres (Morreale et al., 2023). While these datasets allow for the replication of broad stylistic patterns, they often lack the capacity to capture the personal, nuanced intent of individual artists, often leading commodified musical outputs (Déguernel et al., 2022). Training GenAI models with a composer's own works has the potential to overcome these limitations and significantly advance the field. Instead of relying on pre-existing external datasets, the composer/performer-centric GenAI VST plugin suite (CoCo) developed in this project will have the ability to 'learn' from the unique structures, themes, and stylistic elements present in each composer's body of work. This shift fosters a more intimate collaboration, aligning the GenAI process with the composer's unique artistic voice (Avdeeff, 2019). Just as a musical composition is defined by its harmonic, thematic, and structural coherence, the effectiveness of these composer-trained models in enhancing creativity will be measured by how well they function as 'co-composers,' engaging with and reflecting the technical and aesthetic considerations of the artists. The AI-ACT team will focus on developing CoCo in ways that go beyond current 'Big Data' approaches, giving it the ability to adapt dynamically to individual creative processes.

Most AI music generation systems today rely on techniques such as Recurrent Neural Networks (RNNs), Generative Adversarial Networks (GANs), and Variational Autoencoders (VAEs), each with distinct strengths in handling various aspects of musical generation (Roberts et al., 2019). RNNs excel at managing sequences, making them highly effective for capturing the temporal structure of music; GANs are adept at generating music that mimics patterns in the training data; and VAEs utilize latent spaces to compress and recompose musical information (Dong et al., 2018; Liu and Yang, 2018; Yang et al., 2017). However, despite these advancements, many AI systems remain limited by the datasets they are trained on, often producing outputs that reflect inherent biases in the data (Spiekermann and Dethmann, 2024). Datasets like Lakh MIDI[4] and Maestro[5] often lead AI systems to generate music that mirrors specific genres, even when the models were not explicitly designed to replicate those particular styles (Civit et al., 2022). In contrast, this project aims to overcome these limitations by focusing on composer/performer-centric models that learn directly from an individual's creative data, enabling the development of GenAI tools that are personalized, versatile, and aligned with different creative processes.

Although RNNs, GANs, and VAEs are widely used, they struggle to maintain long-term thematic coherence (Chen et al., 2024). This often results in generated music that lacks large-scale structure. In contrast, models like Long Short-Term Memory (LSTM) networks have demonstrated the capacity to overcome these limitations by retaining long-term dependencies essential for musical continuity (Chu et al., 2016; Eck and Schmidhuber, 2002). LSTM networks have been shown to effectively capture and reproduce complex chord progressions and melodic structures, maintaining coherence over time (Hadjeres et al., 2016). The success of these models lies in their ability to maintain stable musical form while continuously generating new content. In this project, we aim to leverage LSTM networks and other advanced models to develop CoCo with the ability to maintain long-term coherence while adapting to individual compositional practices.

A further challenge with current GenAI tools for music composition is the lack of integration with professional environments, such as DAWs and music notation software, which limits the practical usability of these systems for composers and musicians. While tools like Google's Magenta[6] and DeepBach[7] have successfully been integrated into DAWs, the vast majority remain standalone applications or web-based platforms, limiting their usability in professional composition contexts. This limitation in **practical**

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[4] https://colinraffel.com/projects/lmd/
[5] https://magenta.tensorflow.org/datasets/maestro
[6] https://magenta.tensorflow.org/
[7] https://github.com/Ghadjeres/DeepBach

application also extends to issues related to user experience and emotional representation in music generation. Studies have shown that emotions play a pivotal role in music composition, yet these aspects remain significantly underexplored in GenAI music research (Civit et al., 2022; Williams and Lee, 2018; Juslin and Sloboda, 2001). To address these gaps, the AI-ACT project aims to develop CoCo as an intuitive, emotionally attuned interface (utilizing individual artistic data) for co-collaboration in music composition, ensuring that GenAI stays deeply connected to the composer's emotional and creative intentions.

A.1.2   Implications of GenAI in Music Composition Processes

GenAI tools have the potential to fundamentally reshape the compositional process, offering new ways for human composers to engage with state-of-the-art technologies. Historically, analog and digital tools in composition have been used primarily to automate technical aspects or extend the capabilities of instruments. Recent advancements in GenAI have opened the door to more collaborative approaches. Instead of functioning as mere tools, GenAI systems can now act as co-creators, augmenting human creativity in ways once thought impossible. This shift requires a reevaluation of the roles and relationships between composer and machine, challenging traditional notions of agency in the creative process (O'Toole and Horvát, 2024; Cage, 1961).

A key concept in computer music composition is **human-computer co-creativity**, a model where GenAI not only replicates or generates content but engages in a dynamic, reciprocal relationship with the composer (Kantosalo et al., 2015). Gioti (2021) emphasizes that GenAI systems can provide new affordances for composers by expanding the space of creative possibilities. The machine is thus not autonomous but works alongside the human, supporting the composer's artistic intent. The integration of GenAI into music composition thus offers a means to extend human capabilities by introducing novel pathways for creative exploration.

Furthermore, the notion of **human-machine co-agency** suggests that machines are not passive tools but active agents that co-participate in the creative process (Lee, 2023; Rutz, 2021; Jamieson, 2020). Human composers and computational systems interact to produce musical works that cannot be attributed to either party exclusively. The construct of hybrid agency challenges traditional ideas of artistic expression, autonomy, and authorship. This concept parallels Barad's (2007) notion of co-produced phenomena in scientific experimentation, where the observer and the apparatus together generate the outcome.

Temporal relationships further play a critical role in human-machine compositional processes (Maestri, 2020). In composition without GenAI, the creation phase and performance phase are typically separate, with the composer crafting the work before it is presented. However, in interactive systems, such as those incorporating real-time AI-generated elements, these phases can merge, allowing for a fluid exchange between planning and realization. The GenAI, in these scenarios, acts as an active participant, responding to human input and generating new musical material in real-time. Closely related to temporal relationships is the notion of suspension and coupling in human-machine interactions, where composers periodically disengage from the machine to focus on other stages of the creative process. (Malina, 2017).

Building on these dynamics, integrating GenAI into music composition requires reframing the creative process as a shared, fluid exchange between human intuition and machine logic. The concept of hybrid agency, where the composer and the machine co-create in a symbiotic relationship, suggests that the boundaries between human-driven and machine-driven creative decisions are increasingly integrated. This hybridization raises important questions about artistic control, the nature of creativity, and the 'creator' of compositional outputs, as GenAI challenges the very foundations of compositional practice. As the line between composer and tool dissolves, the resulting artistic works are neither solely products of human ingenuity nor mere outputs of algorithmic processes. Instead, they represent novel forms of human-machine collaboration that require composers to rethink their relationship with intelligent technologies, expanding the traditional notion of authorship and creative decision-making. The implications of GenAI in music composition are far-reaching. As composers utilize these systems, they are not merely using new tools but are participating in a broader socio-technical shift, where the boundaries between human and machine creativities and agencies are continually negotiated and redefined.

A.1.3   Drawing on Postdigital Research to Study GenAI in Music Composition

The AI-ACT project draws heavily on the interdisciplinary insights from postdigital research to inform the study of GenAI in music composition. Postdigital theory examines the entangled relationships between analog and digital processes, challenging the binary distinctions (Knox, 2024; Carvalho and Freeman 2023; Lamb et al. 2022; Fawns, 2022, 2019). In music, the postdigital framework provides a critical lens through which the interplay between human creativity and machine-generated outputs can be studied (Peters et al.,

2024). By incorporating postdigital research, AI-ACT aims to investigate how GenAI tools function not merely as technical extensions of the composer but as active participants in co-creative processes.

Postdigital aesthetics can further contribute to a deeper understanding of how artistic practices are evolving (Berry and Dieter, 2015). The postdigital highlights the transition from a fascination with digital technologies to a more critical engagement, reflecting how artists are becoming more aware of the implications of *algorithms*, *computation*, and *data* on their own work. Postdigital is not a rejection of digital technologies but rather a reflection of how deeply they have permeated society and culture (Jandrić, 2023).

The widespread use of digital tools in music-making—such as DAWs, VST plugins, and, more recently, GenAI—has transformed how many composers approach composition today (Giddings, 2022). Rather than viewing these tools as separate from the compositional act, they are becoming embedded within the very fabric of the creative process. This shift aligns with the postdigital condition, where the digital is no longer a disruptive force but a normalized aspect of everyday life (Berry and Dieter, 2015).

The project draws on one of the central themes in postdigital arts research, **aesthetic convergence**, where traditional techniques merge with digital processes to create hybrid forms that challenge conventional notions of medium specificity (Paul and Levy, 2015). In music composition, this convergence manifests in the use of GenAI-driven tools that work alongside human creativity. GenAI systems, for instance, can generate new musical material, harmonize melodies, or even produce entire compositions based on a set of parameters defined by the composer. This partnership between human and machine blurs the boundaries between creator and tool, fostering a co-creative environment that mirrors the hybrid forms seen in other postdigital artistic practices.

Additionally, **computational rationality** profoundly impacts music composition with GenAI, shaping how artists interact with their mediums and conceive their practices (Berry and Dieter, 2015; Berry, 2015). For composers working with GenAI, computational rationality is embedded in the very act of composition. The algorithms that underpin GenAI systems impose a certain logic on the music they generate, one that is shaped by the data they are trained on and the parameters they are given. This neccesitates a **critical engagement with technology**, a defining aspect of the postdigital, particularly concerning issues of control, agency, and data (Giambastiani, 2021). In a world increasingly shaped by Big Data and algorithmic processes, composers need to consider the ethical implications of using GenAI systems. While offering new creative possibilities, GenAI raises concerns about authorship, intellectual property, and the commodification of artistic output. The postdigital condition demands that artists critically engage with the technologies they use, not merely as passive users but as **active participants in shaping the future of these tools**.

A.1.4   AI-Accelerated Creativity Theory (AI-ACT)

The **AI-Accelerated Creativity Theory (AI-ACT)** seeks to provide a comprehensive framework for understanding how GenAI impacts human creativity. At its core, AI-ACT theorizes that the introduction of AI tools into the creative workflow fundamentally changes not only the speed and scope of music generation but also the cognitive processes underlying creativity (Vanka et al., 2023; Cook, 2018; Boden, 2004). A key premise of AI-ACT is the **'paradox of acceleration'**: while GenAI significantly accelerates certain technical tasks and aspects of creative generation, this acceleration can lead to cognitive overload, requiring composers to take more time in reflection, decision-making, and critical assessment (Chernev et al., 2015). Through this lens, AI-ACT theorizes that GenAI tools affect human creativity not just quantitatively (by increasing output speed), but qualitatively, influencing how composers conceptualize, interact with, and reflect upon their creative work.

A crucial goal of the projct is to understand how GenAI tools impact the *human creative* process, particularly in relation to Wallas's (2018) four-stage model: *preparation*, *incubation*, *illumination*, and *verification*. GenAI technologies are reshaping each of these stages, either accelerating or decelerating various aspects of the composer's workflow. In the **preparation** stage, where composers gather, organize, and refine material, GenAI tools can accelerate the process by generating immediate variations and suggestions based on existing data, allowing composers to explore new possibilities more quickly. However, this speed can sometimes lead to a deceleration in thoughtful, deliberate engagement with source material, as rapid output may diminish the time spent reflecting on compositional choices. During **incubation**, where creative ideas evolve subconsciously, GenAI can both accelerate and decelerate the process: while it can continuously produce new ideas for the composer to consider this flood of material might also overwhelm and require longer periods of reflection. In the **illumination** stage, where sudden insights occur, GenAI can facilitate the creative spark by generating novel material that may not have occurred to the composer alone, prompting more frequent moments of inspiration. However, this acceleration can also lead to an over-reliance on AI-generated suggestions, potentially stifling the composer's own intuitive breakthroughs and making it harder to distinguish between genuine artistic insight and machine-generated outputs, thereby

complicating the composer's sense of artistic agency. Lastly, in the **verification** stage, GenAI can accelerate the evaluation and refinement process by offering immediate feedback and alternatives. However, it may also decelerate the deeper, more critical assessment, as the abundance of generated possibilities can complicate the task of selecting and refining the most meaningful elements. These dynamics suggest that while GenAI offers the potential to significantly speed up the creative process, it also introduces new complexities that require composers to adapt their creative thinking and workflows.

Furthermore, AI-ACT draws on Rosa's theory of Social Acceleration (2013), particularly on the concept of *technological acceleration*. The use of GenAI tools in music composition exemplifies the rapid technological acceleration in the field. Rosa's concept of the 'frenetic standstill'—a paradox where everything seems to accelerate while real, meaningful change becomes harder to achieve—is what we refer to as the '**paradox of acceleration'** in the creative process with GenAI. While these technologies enable composers to generate music at an accelerated speed, there is a risk that (1) the creative process itself becomes too transient, losing the reflective depth at the core of genuine artistic expression and (2) the vast amount of generated material greatly slows down key stages of creativity. AI-ACT studies creativity within this new reality, exploring how composers can navigate this paradox by finding a balance between the possibilities offered by AI and the grounded, more deliberate aspects of the compositional process (Lijster, 2018). By studying creativity with GenAI through leading theories on creativity and techno-social acceleration, AI-ACT aims to develop a new theoretical model that enhances our understanding of the complexity of music composition with intelligent computer systems.

A.2   Objectives

A.2.1   Build Co-Composer (CoCo): A Composer/Performer-Centric GenAI VST Suite for Music

The first objective of my project is to develop Co-Composer (CoCo), a composer/performer-centric GenAI Virtual Studio Technology (VST) suite of Digital Audio Workstation (DAW) plugins for music creation. CoCo will enable composers to train AI models using their own creative data, allowing personalized, real-time collaboration between human and machine.

A.2.2   Establish the AI-Accelerated Creativity Theory (AI-ACT)

The second objective of my project is to establish the AI-Accelerated Creativity Theory (AI-ACT), which will systematically describe how GenAI tools interact with and influence the creative process in music composition. By examining the dynamics between human creativity and GenAI systems, AI-ACT will explore how these tools accelerate or decelerate various stages of composition, offering a comprehensive framework for understanding the complexities of Human-AI (HAI) collaboration in artistic workflows.

A.2.3   Compose and Present Original Works Utilizing CoCo and AI-ACT

The third objective of my project is to compose and present original works created by the team using the Co-Composer (CoCo) VST suite and the AI-Accelerated Creativity Theoretical Framework (AI-ACT). This objective will put the project's technological and theoretical innovations into practice through new works that explore the interplay between human creativity and generative GenAI systems. These compositions will enable real-world testing and refinement of both the CoCo VST suite and the AI-ACT framework.

B.   Methodology

B.1   WP1: Build Co-Composer (CoCo) VST Plugin Suite for Music Composition

This work package focuses on the development, testing, and release of Co-Composer (CoCo), a GenAI Virtual Studio Technology (VST) plugin suite for music composition in Digital Audio Workstations (DAWs) and music notation software programs. The aim of this work package is to create a set of AI-driven tools that enable composers to train generative models using their own creative data (e.g., scores, audio files, MIDI), fostering personalized and real-time interaction. Through an innovative research methodology that bridges Design-Based Research (DBR), Arts-Based Research (ABR), and qualitative methods, the CoCo VST suite will be iteratively developed and refined, ensuring its design is grounded in empirical findings.

Sub-stage 1.1: Requirement Gathering and Conceptual Design (PI; Postdoc 1)
In this initial stage, the research team will engage with composers from various musical genres to gather detailed requirements for the CoCo VST suite. In addition to DBR and ABR, this stage will involve

interviews, focus groups, and surveys aiming to capture specific needs of composers. Special attention will be given to ensuring that the tools allow composers to incorporate their own creative data for personalized AI model training. The outcome of this sub-stage will be a comprehensive requirements document and a conceptual design of the CoCo system, outlining its key functionalities, user interface design, and integration into existing DAWs.

Sub-stage 1.2: Prototype Development (PI; Postdocs)
With the requirements and design in place, the second stage will focus on building the initial prototypes of the CoCo VST suite. This will involve the development of AI models based on machine learning techniques such as Long Short-Term Memory (LSTM) networks and Variational Autoencoders (VAEs), with the ability to process and respond to creative data provided by composers. The prototypes will enable composers to interact with the generative models in real-time, generating tailored material or experimenting with various compositional forms. Postdoctoral researchers will take the lead in programming the prototypes, ensuring compatibility with industry-standard DAWs. The outcome will be a set of functional prototypes that will serve as the foundation for further development.

Sub-stage 1.3: Public Beta Testing and User Feedback (Entire Team)
In this stage, the CoCo prototypes will undergo rigorous testing with professional composers, including PhD students involved in the project. Through ABR, the research team will document how composers engage with the CoCo tools in their creative processes, using methodologies such as user observation, self-reflective journals, and interviews. Feedback will be gathered on usability, functionality, and creative impact, ensuring that the tools align with diverse compositional workflows. Special attention will be given to how well the AI models adapt to the composers' workflows and artistic attentions. The outcome of this stage will be a refined version of the CoCo tools, informed by empirical data from users.

Sub-stage 1.4: Final Development and Optimization (PI; Postdoc 2)
Following the beta testing and feedback analysis, this sub-stage will focus on the final development and optimization of the CoCo VST suite. This phase will involve addressing any usability issues, improving the system's responsiveness for real-time composition, and refining the AI models to ensure they support long-term thematic coherence in music generation. We will work to enhance the tools' integration into DAWs, ensuring seamless compatibility and professional-level performance. The outcome will be a fully developed, optimized, and user-friendly version of the CoCo suite.

Sub-stage 1.5: Open Source Launch and Documentation (PI; Postdoc 2; PhD 2)
The final sub-stage will focus on the dissemination of the CoCo VST suite to the public and research community. The tools will be made available as open-source software, allowing for widespread use and future research. Individual and co-authored scientific articles will be submitted for publication in high-level (Q1) journals. Comprehensive documentation, including technical manuals, user guides, and video tutorials, will be created to support users with varying levels of technical expertise. The launch will be accompanied by conference presentations and public workshops. The outcome will be the successful release of CoCo as an open-source tool, with clear documentation and resources for its adoption by the broader creative and research communities.

❖ WP1 will ensure that the CoCo VST suite is developed as a robust, flexible, and composer/performer-centric tool for generative AI music composition, grounded in real-world compositional practices, developed through DBR, ABR and qualitative methods.

B.2   WP2: AI-Accelerated Creativity Theory (AI-ACT) Development

This work package focuses on the development and formalization of the AI-Accelerated Creativity Theory (AI-ACT), a framework. Through empirical studies, theoretical insights, and real-world applications, AI-ACT strives to provide a comprehensive understanding of how GenAI tools influence different stages of the creative process. The framework will investigate the '**paradox of acceleration**' in creativity—how GenAI can potentially accelerate and decelerate stages of the compositional workflow—and offer new models for human-AI (HAI) collaboration in artistic environments. ABR and qualitative methodologies will be employed ensuring that AI-ACT is grounded in empirical data.

Sub-stage 2.1: Literature Review and Theoretical Foundations (PI; PhD 1)

The initial sub-stage will focus on conducting a comprehensive review of existing literature in the areas of creativity models, human-computer interaction (HCI), and GenAI in artistic practices. The aim of this review is to identify gaps in current theoretical frameworks, specifically regarding AI's role in the creative process. The research team will map existing creativity models—such as Wallas's (2018) four-stage model—in the context of GenAI-augmented workflows. Particular attention will be given to theories of acceleration, such as Rosa's (2013) theory of Social Acceleration, and how they intersect with Human-AI Interaction (HAI). The outcome of this stage will be a foundational document synthesizing existing research, which will serve as the theoretical backbone of the AI-ACT framework.

Sub-stage 2.2: Empirical Studies on Human-AI (HAI) Collaboration in Composition (Postdocs; PhD Students)
This sub-stage will involve empirical studies to investigate how GenAI tools, such as the CoCo VST suite, influence the different phases of the creative process in music composition. Through ABR methodologies, the project team will create new compositions and collect data from professional composers working with CoCo. Data will be gathered through self-reflective journals, video and computer-screen recordings of the compositional process, and semi-structured interviews. Particular focus will be given to how GenAI tools impact key stages of creativity. The outcome of this sub-stage will be compositions and datasets capturing the cognitive and creative dynamics of Human-AI (HAI) collaboration, which will inform the further development of AI-ACT.

Sub-stage 2.3: Framework Development and Formalization (Entire Team)
Building on the empirical data collected in Sub-stage 2.2, this stage will focus on developing the AI-ACT framework. Using grounded theory approaches, the research team will systematically analyze the data to identify patterns in how composers interact with GenAI systems. The framework will be applied to study the **paradox of acceleration**—how GenAI simultaneously accelerates and decelerates stages of creativity—and provide models for understanding the temporal dynamics of co-creativity between human and machine. AI-ACT will also address the concept of hybrid agency, where the composer and AI interact as co-agents in the creative process. The outcome will be a formalized AI-ACT framework that can be applied across various creative contexts, offering new theoretical models for studying creativity with GenAI.

Sub-stage 2.4: Validation Through Broader Artistic Community (PI; PhD Students)
Once the AI-ACT framework has been formalized, this sub-stage will focus on validating its applicability across a broader range of musical genres and compositional practices. The research team will conduct workshops and focus groups with composers outside the core research team, including those working in genres such as popular music, concert music, and electronic music. The goal is to ensure that the AI-ACT framework accurately reflects diverse creative workflows and the realities of artistic practices in different contexts. Feedback from these sessions will be used to refine and expand the framework. The outcome will be a validated and robust AI-ACT framework that is versatile enough to apply across the spectrum of contemporary music composition and other disciplines.

Sub-stage 2.5: Dissemination and Engagement (Entire Team)
The final sub-stage will focus on the dissemination of the AI-ACT framework to both academic and creative communities. This will involve the publication of high-impact, peer-reviewed articles detailing the theoretical and empirical findings of the research. The research team will also present the AI-ACT framework at international conferences in fields such as music technology, creativity studies, and human-computer interaction (HCI). To further engage the creative community, the project will host workshops, inviting composers, researchers, and developers to explore the implications of the AI-ACT framework. The outcome of this sub-stage will be a series of published articles, conference presentations, and public workshops that disseminate AI-ACT to a wide audience, ensuring its long-term impact and contribution to future research.

❖ WP2 will ensure that the AI-ACT framework is rigorously developed, empirically grounded, and widely disseminated.

B.3 WP3: Composition and Performance of Original Works Using CoCo and AI-ACT

This work package focuses on the practical application of the tools and theoretical framework developed in the previous work packages. The primary goal of WP3 is to compose, present, and analyze original music compositions created using the Co-Composer (CoCo) VST suite guided by the AI-Accelerated Creativity

Theory (AI-ACT) framework. These compositions will be developed through Arts-Based Research (ABR) methodologies, providing real-world testing and refinement of both CoCo and AI-ACT. The project will feature musicians and ensembles in residence, who will collaborate with the composers to perform and record the original works, providing critical insights into Human-AI Interaction (HAI) in both the compositional and performance contexts. Each sub-stage of WP3 will culminate in a concert performance showcasing the compositions created during that phase. These concerts, held at **national**, **European**, and **international** settings, will progressively increase the visibility and reach of the project, expanding its impact. They will also serve as platforms for testing and evaluating the CoCo tools in live performance settings, gathering data that will inform further refinement of both the software and the AI-ACT framework.

Sub-stage 3.1: First Set of Original Works and Concert I (National) (PI; PhD Students)

In this initial sub-stage, the project team will compose the first set of original works using early prototypes of the CoCo VST suite. The focus will be on testing the basic functionality of the tools in real-world compositional contexts. This phase will emphasize the use of personalized AI models, trained using the composers' own creative data. This sub-stage will culminate in **Concert I**, which will be held at the University of Siegen, Germany. This event will showcase the initial compositions performed by the resident musicians and serve as a testing ground for evaluating how well the CoCo prototypes support the creative processes. The outcome of this sub-stage will include the creation of initial compositions, a concert presentation, and critical feedback from both performers and audiences to guide the further development of CoCo and AI-ACT.

Sub-stage 3.2: Second Set of Original Works and Concert II (European Union) (Entire Team)

In the second phase, the research team will collaborate closely with musicians to develop more complex compositions that push the boundaries of the interaction between human creativity and generative AI systems. This phase will explore more advanced compositional processes, particularly focusing on the dynamics of real-time interaction between AI and performers. A potential partner for **Concert II** is the TENOR International Conference on Technologies for Music Notation and Representation, which was recently held at the Institute for Computer and Sound Technology (ICST) at Zurich University of the Arts (ZHdK). Having a strong connection with the organizers of TENOR through past conference presentations, I will leverage this network to increase the visibility of the project. The concert will provide a European platform to present the progress made with the project, gathering critical insights from an international academic and artistic audience. The outcome of this sub-stage will be a set of advanced compositions, feedback from European collaborators, and additional refinements to the tools and framework based on these evaluations.

Sub-stage 3.3: Third Set of Original Works and Concert III (International) (PI; Postdoc 2; PhD2)

Concert III will be held internationally and serve as the culminating public presentation, featuring the final compositions developed with the refined CoCo VST suite and AI-ACT framework. This concert will showcase the most mature and fully realized works of the project, illustrating the potential of Human-AI (HAI) collaboration in music composition. Potential partners include the International Computer Music Conference (ICMC), hosted this year at Hanyang University in Seoul, South Korea, or The Center for Creative Technology at the Juilliard School in New York, United States. I have established strong connections with both institutions, having collaborated on projects with them in recent years. These partnerships will provide an international platform for showcasing the project's final outcomes and expanding its reach globally. The outcome of this sub-stage will include final compositions, a concert presentation, and critical reflection on the project's impact on both the creative and research communities.

❖ WP3 ensures the application of the technological and theoretical innovations developed through the CoCo VST suite and AI-ACT framework, culminating in the creation and public presentation of original compositions that push the boundaries of Human-AI (HAI) collaboration in music composition. By progressively expanding the project's visibility through national, European, and international performances, WP3 will elevate the project's reach and impact, promoting collaboration and critical engagement with the broader creative and research communities.

B.4   Research Team

The success of this project will rely on a diverse and interdisciplinary team, each member contributing specific expertise aligned with the project's objectives. The team will consist of a Principal Investigator (PI), two postdoctoral researchers (Postdocs), two PhD students, and one student assistant. Each team member

will play a crucial role in meeting the objectives of the project: (1) development of the CoCo VST suite (WP1), (2) establishment of the AI-Accelerated Creativity Theory (AI-ACT) (WP2), and (3) the composition and presentation of original works (WP3).

Principal Investigator (PI): As the Principal Investigator (PI), I will provide overall leadership and strategic direction for the full 60-month duration of the project. I will guide the development of the Co-Composer (CoCo) VST plugin suite and the AI-Accelerated Creativity Theory (AI-ACT) framework. With experience supervising graduate students at the University of Siegen, I will mentor the two PhD students and two postdoctoral researchers. I will oversee the interdisciplinary collaboration required for AI-ACT. In addition to my role in managing the day-to-day aspects of the project, I will lead our dissemination efforts, including publishing in peer-reviewed journals, presenting at international conferences, and organizing public workshops and performances. I will manage project timelines, budgets, and deliverables, ensuring that we stay on schedule and within financial constraints, while maintaining regular communication with the funding body. With my experience in leading interdisciplinary projects and a strong track record in music composition with digital technology, I am committed to ensuring that the project is completed succesfully.

Postdoctoral Researcher 1 (Postdoc 1): I will be recruiting a Postdoctoral Researcher in month 7. They will have expertise in GenAI systems and VST plugin development and will contribute to the design, programming, and testing of the Co-Composer (CoCo) VST suite. This individual will develop and implement VSTs utilizing machine learning models, such as LSTM networks, GPTs, GANs, and transformer models, integrating them into Digital Audio Workstations (DAWs). They will lead the iterative prototyping and testing phases, while incorporating user feedback to refine and improve the CoCo suite further. In collaboration with PhD students and guest musicians, they will integrate personalized creative data to ensure CoCo reflects the artistic intentions of individual users. Additionally, this postdoc will contribute to advancing the AI-Accelerated Creativity Theory (AI-ACT) framework and disseminating research findings through peer-reviewed publications and international conferences.

Postdoctoral Researcher 2 (Postdoc 2): I will be recruiting a Postdoctoral Researcher in AI VST Development to join the project at a critical stage, starting in month 25, to continue the development of the Co-Composer (CoCo) VST suite. Their main responsibilities will include refining, optimizing, and preparing CoCo for open-source release, while ensuring usability, performance, and integration with industry-standard Digital Audio Workstations (DAWs). This postdoc will also address feedback from professional composers, support the creation of documentation and tutorials. In addition, they will be involved in disseminating the project's outcomes through publications, conference presentations, and partnerships with industry stakeholders.

PhD Student 1 (Popular Music Focus): I will be recruiting a PhD Student in Popular Music Composition and Technology in month 7. This individual will be a composer-researcher focused on the intersection of composition and AI technologies in popular music. This student will play a key role in the development and testing of the Co-Composer (CoCo) VST suite, training it on their own creative works and composing new compositions. Their work will document how GenAI impacts creativity in popular music, offering genre-specific insights for the AI-Accelerated Creativity Theory (AI-ACT) framework. Additionally, they works they compose will be presented at national and international venues as part of the project's dissemination strategy.

PhD Student 2 (Concert Music Focus): The second PhD Student will specialize in Contemporary Concert Music, with a strong background in acoustic, electro-acoustic, or electronic composition. Joining the project in month 19, they will play a key role in the later stages of CoCo VST suite development. Their input will be crucial for refining CoCo's capabilities within concert music contexts, while also contributing genre-specific insights to the AI-Accelerated Creativity Theory (AI-ACT) framework. The PhD student will document their creative interactions with CoCo, participate in empirical studies on human-AI (HAI) collaboration, and contribute to the project's dissemination through publications and public performances.

Student Assistant: I will recruit as Student Assistant to support the AI-ACT research team from month 4 through the project's completion, assisting with day-to-day logistics and administrative tasks to ensure smooth project execution. Their responsibilities will include organizing focus groups, workshops, and composer interviews, as well as providing logistical support for empirical studies, such as managing data collection and video recording. The student assistant will also help prepare materials for the open-source

release of the Co-Composer (CoCo) VST suite, including user guides and tutorials, and assist in organizing public concerts for project dissemination. Additionally, they will contribute to managing the project's online presence, including website updates and social media outreach.
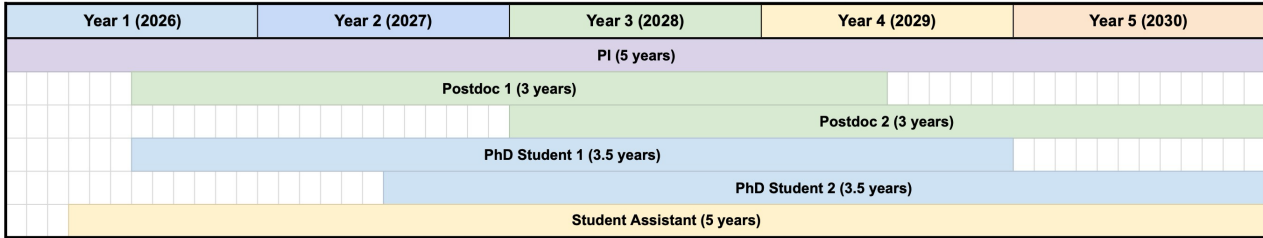
B.4.1 Diversity Statement

The AI-ACT research project is committed to fostering diversity, equity, and inclusion at every level of its development and implementation. We believe that diversity of thought, experience, and perspective is essential to driving innovation and creativity in both academic research and artistic practice. We recognize that the intersection of human creativity and AI presents profound ethical and cultural questions, and we are committed to exploring these questions through diverse perspectives. By fostering interdisciplinary collaboration and encouraging a wide range of creative approaches, we aim to ensure that the tools developed within the AI-ACT project reflect the richness and diversity of global musical traditions and practices. This includes incorporating input from composers, musicians, and technologists from various cultural backgrounds, musical genres, and artistic practices. A key goal of the AI-ACT project is to contribute to the broader academic and industry initiatives aimed at increasing the representation of underrepresented groups in academia, particularly women and minority groups in the fields of AI, music technology, and composition. Gender diversity remains a significant challenge in both music technology and AI, with women historically underrepresented in these fields, especially in academic and leadership positions. As such, we are proactively seeking to increase the number of women employed in academic positions through the hiring of postdoctoral researchers and PhD students in this project. By promoting gender balance within our research team, we aim to contribute to the wider effort to address gender disparities in European academia.
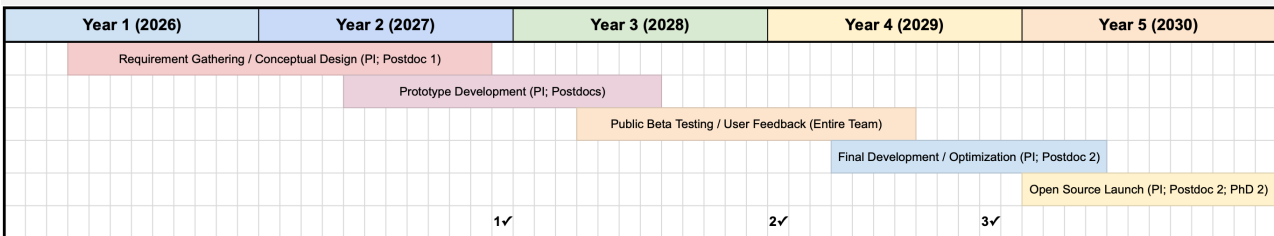
B.5   Timeline

The project duration is 60 months. Below are the timelines for the recruitment of the research team and the three work packages, including the team member(s) responsible for each sub-stage of the work packages. The "✓" (check marks) in WP1, WP2, and WP3 indicate risk mitigation milestones. The "X" symbols in WP3 indicate the public concert dates.
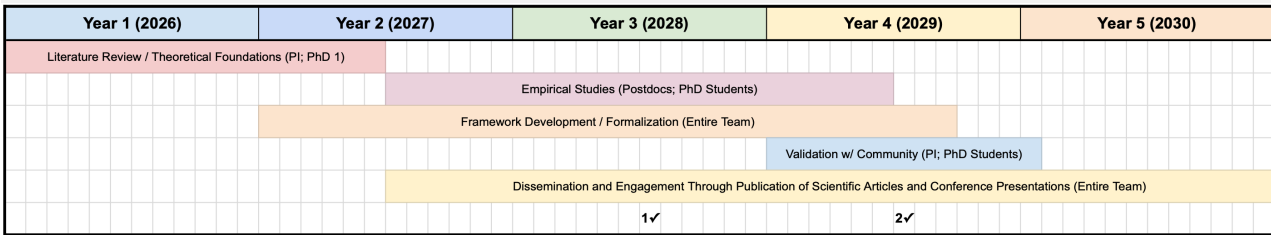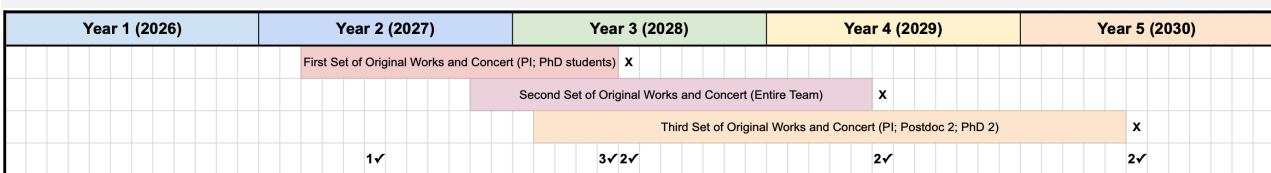
B.5.1   Team Recruitment Timeline

Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)
PI (5 years)				
	Postdoc 1 (3 years)			
		Postdoc 2 (3 years)		
	PhD Student 1 (3.5 years)			
		PhD Student 2 (3.5 years)		
	Student Assistant (5 years)			

B.5.2   WP1 Timeline

Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)
Requirement Gathering / Conceptual Design (PI; Postdoc 1)				
	Prototype Development (PI; Postdocs)			
		Public Beta Testing / User Feedback (Entire Team)		
			Final Development / Optimization (PI; Postdoc 2)	
				Open Source Launch (PI; Postdoc 2; PhD 2)
	1✓	2✓	3✓	

B.5.3   WP2 Timeline

Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)
Literature Review / Theoretical Foundations (PI; PhD 1)				
		Empirical Studies (Postdocs; PhD Students)		
	Framework Development / Formalization (Entire Team)			
			Validation w/ Community (PI; PhD Students)	
	Dissemination and Engagement Through Publication of Scientific Articles and Conference Presentations (Entire Team)			
	1✓	2✓		

B.5.4   WP3 Timeline

Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)
First Set of Original Works and Concert (PI; PhD students) X				
	Second Set of Original Works and Concert (Entire Team) X			
		Third Set of Original Works and Concert (PI; Postdoc 2; PhD 2) X		
	1✓	3✓2✓	2✓	2✓

B.6   Detailed Risk Analysis and Mitigation Measures

AI-ACT presents significant opportunities but also critical risks that must be carefully managed to ensure successful outcomes. The high-risk, high-reward nature of the project is balanced by the team's expertise and a structured approach to risk management. Below, I outline the primary risks for each of the three work packages (WP1: CoCo Development, WP2: AI-ACT Framework, WP3: Composition and Performance), along with mitigation strategies and contingency plans. Milestones are included to track progress and manage risks effectively.

WP1: Development of Co-Composer (CoCo) VST Plugin Suite
Risk 1: Data Scarcity and Quality
    Description: Individual composers may have insufficient volumes of high-quality creative data (scores, audio files, MIDI) to effectively train AI models. This could limit the ability of the CoCo VST suite to generate meaningful and diverse outputs. **Impact:** The performance of personalized AI models may be compromised, resulting in narrow or uncreative outputs. **Likelihood:** Moderate.

Mitigation Strategy: To address data scarcity, the CoCo VST suite will include features allowing composers to augment their datasets with variations of their own work (e.g., through transformations or interpolations). The project will also explore hybrid models trained on both personal and broader datasets to enhance adaptability while retaining personalization. **Contingency Plan:** If data remains insufficient, the research team will create pre-trained model templates that can be fine-tuned on smaller datasets, allowing CoCo to function effectively with limited data. Additional collaborations with composers who have large, varied datasets could supplement the model training process. **Milestone**: Functional prototype of CoCo capable of being trained on personal datasets (Month 24).

Risk 2: Computational Demands and System Integration
   Description: AI-powered VSTs like CoCo may strain DAWs, leading to latency, slower performance, or system crashes, especially during real-time processing in complex projects. This could hinder CoCo's usability in professional settings. **Impact**: Composers may find CoCo impractical for real-time collaboration, affecting user adoption and project outcomes. **Likelihood**: Moderate to High. **Mitigation Strategy**: Optimization strategies, such as model compression and parallel processing techniques, will be implemented to reduce computational demands. Additionally, a scalable architecture that allows for offline processing (e.g., pre-rendering AI-generated outputs) will be developed for composers working on complex projects. **Contingency Plan**: If latency or crashes persist, a lighter version of CoCo will be released, focused on simpler, less resource-intensive tasks. Collaboration with DAW developers will also be pursued to ensure compatibility. **Milestone**: Stable beta version of CoCo with real-time processing capabilities tested (Month 37).

Risk 3: Over-Specialization of AI Models
   Description: AI models trained exclusively on a single composer's works may become too narrow, limiting their creative potential and adaptability in broader contexts. This could lead to overly repetitive outputs that do not support innovation. **Impact:** CoCo might fail to inspire new creative directions, limiting its use for experimental compositions. **Likelihood:** Low to Moderate. **Mitigation Strategy:** CoCo will incorporate multi-domain training options, allowing composers to mix personal data with general music datasets. Additionally, the AI models will be designed to support creative exploration, including randomization features and tools that facilitate experimentation beyond the composer's initial dataset. **Contingency Plan:** If over-specialization persists, the research team will develop model features that allow for more exploratory or stochastic generation methods, ensuring outputs remain novel and inspiring. **Milestone:** Final CoCo model capable of handling personalized and generalized datasets (Month 47).

WP2: Development of AI-Accelerated Creativity Theory (AI-ACT)
Risk 1: Over-Reliance on or Dilution by Multiple Creativity Theories
   Description: The integration of diverse theoretical constructs on creativity may result in an overly complex AI-ACT framework that lacks coherence or practical applicability. **Impact:** The theoretical contributions of AI-ACT may be weakened, limiting its relevance to empirical studies and practical application in artistic research. **Likelihood:** Low. **Mitigation Strategy:** The AI-ACT framework will prioritize the creative process itself and focus on how human-AI interaction shapes creativity. Arts-Based Research (ABR) and qualitative methodologies will ensure the framework remains grounded in empirical data from real-world practices. **Contingency Plan:** If over-reliance on theoretical constructs becomes a problem, the research team will streamline the AI-ACT framework, focusing on a limited set of key concepts that emerge directly from empirical studies. The framework can be revised based on practical insights from WP1 and WP3. **Milestone:** AI-ACT draft framework completed with initial empirical data (Month 31).

Risk 2: Insufficient Empirical Data
   Description: Due to potential delays in WP1 or limited access to professional composers, there is a risk of insufficient empirical data for developing the AI-ACT framework, especially if CoCo is not fully functional in time for the studies. **Impact:** The AI-ACT framework might be based on incomplete or unrepresentative data, limiting its theoretical robustness. **Likelihood**: Low to Moderate. **Mitigation Strategy:** Initial empirical studies will use CoCo prototypes and existing GenAI tools to gather early data on human-AI (HAI) interactions. Studies will be conducted iteratively, allowing for continuous refinement of the framework as CoCo develops. **Contingency Plan:** If empirical data remains limited, the research team will extend the timeline for data collection

and consider incorporating additional data from external sources, such as interviews with composers who use other GenAI tools. This will ensure that data collection aligns with the development of the AI-ACT framework. **Milestone:** Completion of extensive empirical data collection (Month 43).

WP3: Composition and Performance of Original Works
Risk 1: Ethical Concerns and Over-Automation

    Description: There is a risk that AI tools might over-automate the creative process, potentially diminishing the human role in composition. This raises ethical concerns about creative agency and intellectual property ownership of AI-generated works. **Impact:** This could limit the artistic validity of compositions and create controversy over the authorship of works created with CoCo. **Likelihood:** Low to Moderate. **Mitigation Strategy:** The project will emphasize human-AI co-creativity, ensuring that AI acts as an assistant or collaborator rather than a sole creator. Clear authorship guidelines will be established, where AI-generated material is treated as part of a collaborative process. Ethical considerations, including intellectual property rights, will be discussed with all participating composers. **Contingency Plan:** If over-automation becomes a significant concern, tools within CoCo that allow composers to retain greater control over the creative process will be enhanced, limiting the extent of automation. Additional ethical workshops will be conducted to address concerns from composers and collaborators. **Milestone:** Establishment of ethical guidelines for AI-composed works (Month 18).

Risk 2: Performance and Audience Reception

    Description: Technological malfunctions during live performances using CoCo could the impact public concerts. **Impact:** This may hinder the visibility and reception of the project, reducing its public engagement and dissemination goals. **Likelihood:** Low to Moderate. **Mitigation Strategy:** Extensive technical rehearsals will be conducted, with fallback systems (e.g., redundant set-ups) prepared in case of real-time failures. **Contingency Plan:** If technological malfunctions occur, the project team will pivot towards hybrid concert formats, where AI tools are showcased alongside traditional music-making processes. **Milestone:** Successful execution of first public concert (Month 30), second (Month 42), and final international concert (Month 54).

Risk 3: PhD Student Compositional Agency and Versatility of AI Models

    Description: PhD students in popular and concert music may struggle with the balance between AI-generated and human-created content. Over-reliance on AI could diminish their compositional voice, while under-utilization could limit creative breakthroughs. *Impact:* The compositions produced may lack clear artistic direction or fail to fully explore the potential of human-AI (HAI) collaboration. *Likelihood:* Low to Moderate. *Mitigation Strategy:* Regular mentoring sessions will ensure PhD students maintain a balance between human and AI-generated content, encouraging them to experiment with and refine their workflows. *Contingency Plan:* If AI-generated content dominates or limits creativity, the PhD students will be encouraged to limit AI use in early phases and gradually integrate it as a complementary tool. Feedback from workshops and performances will guide adjustments in their compositional approach. *Milestone:* Completion of initial compositions by PhD students for public performance (Month 24).

Summary of Contingency Plans and Milestones:

1. *Data scarcity and AI model training* → Contingency: Hybrid model training, pre-trained templates.
2. *Real-time performance and latency in DAWs* → Contingency: Offline processing, lighter version of CoCo.
3. *Empirical data collection for AI-ACT* → Contingency: Use existing GenAI tools, extend timeline for collection.
4. *Public concerts* → Contingency: Redundant playback rigs, hybrid concert formats.

AI-ACT will navigate the project's challenges, ensuring that it achieves project objectives. By identifying and addressing risks early, the project is well-positioned to succeed in delivering impactful research outcomes.

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Appendix: All current grants and on-going / submitted grant applications of the PI (Funding ID)

<u>Mandatory information</u> (does not count towards page limits)

Current research grants (Please indicate "No funding" when applicable):

Project Title	*Funding source*	*Amount (Euros)*	*Period*	*Role of the PI*	*Relation to current ERC proposal*
No funding					

On-going / submitted grant applications (Please indicate "None" when applicable):

Project Title	*Funding source*	*Amount (Euros)*	*Period*	*Role of the PI*	*Relation to current ERC proposa*
None					

Universität Siegen

European Research Council

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Az. 202

Siegen, 30.09.2024

Commitment of the Host Institution for ERC Calls 2025,

The **UNIVERSITAET SIEGEN**, which is the applicant legal entity, confirms its intention to sign a supplementary agreement with **Univ.-Jun.-Prof. Dr. Lawrence Wilde** in which the obligations listed below will be addressed should the proposal be retained.

Performance obligations of the applicant legal entity (Host Institution) that will become the coordinator of the HE ERC Grant Agreement (hereafter referred to as the Agreement), should the proposal be retained and the preparation of the Agreement be successfully concluded:

The applicant legal entity (Host Institution) commits itself to ensure that the action tasks described in Annex 1 of the Agreement are performed under the guidance of the principal investigator who is expected to devote:

- in the case of a Starting Grant at least 50% of her/his working time to the ERC-funded project (action) and spend at least 50% of her/his working time in an EU Member State or Associated Country;

- in the case of a Consolidator Grant at least 40% of her/his working time to the ERC-funded project (action) and spend at least 50% of her/his working time in an EU Member State or Associated Country;

- in the case of an Advanced Grant at least 30% of her/his working time to the ERC-funded project (action) and spend at least 50% of her/his working time in an EU Member State or Associated Country.

The applicant legal entity (Host Institution) commits itself to respect the following conditions for the principal investigator and their team:

a) host and engage the principal investigator for the whole duration of the action;

b) take all measures to implement the principles set out in the Commission recommendation on the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers — in particular regarding working conditions, transparent recruitment processes based on merit and career development — and ensure that the principal investigator, researchers and third parties involved in the action are aware of them;

c) enter — before grant signature— into a Supplementary Agreement with the principal investigator, that specifies the obligation of the applicant legal entity to meet its obligations under the Agreement;

d) provide the principal investigator with a copy of the signed Agreement;

e) guarantee the principal investigator scientific independence, in particular for the:
   i) use of the budget to achieve the scientific objectives;
   ii) authority to publish as senior author and invite as co-authors those who have contributed substantially to the work;
   iii) preparation of scientific reports for the action;
   iv) selection and supervision of the other team members, in line with the profiles needed to conduct the research and in accordance with the beneficiary's usual management practices;
   v) possibility to apply independently for funding;
   vi) access to appropriate space and facilities for conducting the research;

f) provide — during the implementation of the action — research support to the principal investigator and the team members (regarding infrastructure, equipment, access rights, products and other services necessary for conducting the research);

g) support the principal investigator and provide administrative assistance, in particular for the:
   i) general management of the work and their team;
   ii) scientific reporting, especially ensuring that the team members send their scientific results to the principal investigator;
   iii) financial reporting, especially providing timely and clear financial information;
   iv) application of the beneficiary's usual management practices;
   v) general logistics of the action;
   vi) access to the electronic exchange system;

h) inform the principal investigator immediately (in writing) of any events or circumstances likely to affect the Agreement;

i) ensure that the principal investigator enjoys adequate:
   i) conditions for annual, sickness and parental leave;
   ii) occupational health and safety standards;
   iii) insurance under the general social security scheme, such as pension rights;

j) allow the transfer of the Agreement to a new beneficiary, if requested by the principal investigator and provided that the objectives of the action remain achievable (portability; see Article 41 of the Agreement);

k) respect the fundamental principle of research integrity and ensure that persons carrying out research tasks under the action follow the good research practices and refrain from the research integrity violations described in the European Code of Conduct for Research Integrity . If any such violations or allegations occur, verify and pursue them and bring them to the attention of the Agency.

For the applicant legal entity (Host Institution):

Date
30.09.2024

Name and Function
Ulf Richter ; Head of Administration

Email and Signature (blue ink or digital) of legal representative

kanzler@zv.uni-siegen.de ;

Stamp of the applicant legal entity (Host Institution)

Praeses et Curatores Vniuersitatis Princetoniensis
Omnibus has litteras lecturis
Salutem in Domino.

Quandoquidem decet eis qui ad altissimum gradum doctrinae ac disciplinae
ascenderint amplissimum gradum academicum deferri ut et praemia suis meritis
digna adipiscantur et disciplina ipsa honore augeatur, quando autem

Lawrence Irving Wilde

non tantum in eruditione ingenioque tam praeclare enitet sed in scientia

musicae

tam praecipue eminet ut summos publicos honores probe mereatur, idcirco nos
Praeses et Curatores Vniuersitatis Princetoniensis eidem titulum gradumque

Philosophiae Doctoris

tribuimus et singulis iuribus privilegiis honoribus ad summum gradum quaqua
pertinentibus fruendi potestatem detulimus.
Cuius rei haec membrana sigillo nostrae Vniuersitatis rata et nominibus
Praesidis et Scribae munita testimonio sit.

Datum Aulae Nassouicae
die XX Novembris
A.S. MMXXI

Praeses

Scriba

PRINCETON UNIVERSITY

Office of the Registrar
330 Alexander Street, 4th Floor
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October 11, 2024

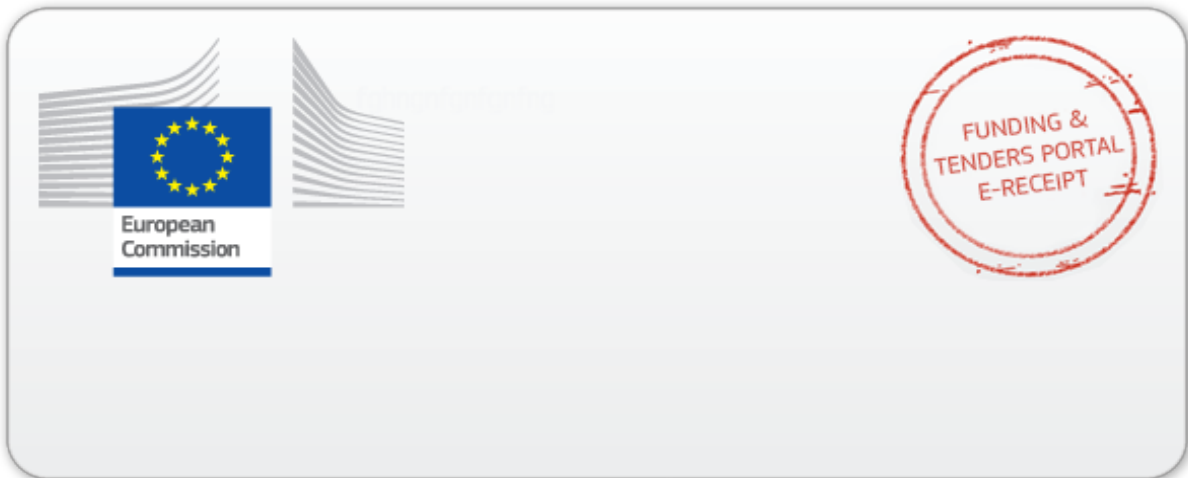Re**: Degree Certification – Lawrence Wilde**

To Whom It May Concern:

This letter certifies that Lawrence Wilde was an enrolled Ph.D. student at Princeton University and having successfully defended his dissertation on September 15, 2021 and completing all requirements, was awarded the Doctor of Philosophy (Ph.D.) degree in Music on November 20, 2021.

If you have any question please be in touch.

Sincerely,

Justin T. Bronfeld, Deputy Registrar
Princeton University
330 Alexander Street, 4th floor
Princeton NJ 08540
bronfeld@princeton.edu

Step 1 Evaluation Report
CONFIDENTIAL

Call reference	ERC-2025-STG
Activity	HORIZON ERC Grants
Funding scheme	ERC STARTING GRANTS
Panel name	SH8
Proposal No.	101220792
Acronym	AI-ACT
Applicant Name	Lawrence WILDE
Title	AI-Accelerated Creativity Theory: The Future of Music Composition with Generative Artificial Intelligence

EVALUATION CRITERIA

Criterion 1 - RESEARCH PROJECT
Ground-breaking nature and potential impact of the research project
To what extent does the proposed research address important scientific challenges?
To what extent are the objectives ambitious and beyond the state of the art (e.g. novel concepts and approaches or development between or across disciplines)?

Scientific Approach
To what extent is the outlined scientific approach feasible bearing in mind the ground-breaking nature and ambition of the proposed research (based on the Extended Synopsis)?

Criterion 2 - PRINCIPAL INVESTIGATOR
Intellectual capacity and creativity
To what extent has the PI demonstrated the ability to conduct ground-breaking research?
To what extent does the PI provide evidence of creative and original thinking?
To what extent does the PI have the required scientific expertise and capacity to successfully execute the project?

PANEL SCORE AND RANKING RANGE

Final panel score:	B (is of high quality but not sufficient to pass to Step 2 of the evaluation. Please note that you may also be subject to resubmission limitations in the next call)
Ranking range*: 43%-52%	
For your information, only the top 32% of the proposals evaluated in panel SH8 were retained for Step 2.	

* Ranking range of your proposal out of the proposals evaluated by the panel in Step 1, in percent, from 1% for the highest ranked proposals to 100% for the lowest ranked.

PANEL COMMENT

This evaluation report contains the final score awarded by the ERC review panel during the first step of the ERC Starting Grant review and the ranking range. The discussion of the panel was conducted within the context of the individual reviews submitted by ERC panel members.

The panel closely examined all the individual review reports and, while not necessarily subscribing to each and every opinion expressed, found that they provide a fair overall assessment. The comments of the individual reviewers were the basis for the discussion and the final recommendation of the panel, and are included in this report.

The PI has already had significant research publications in human-computer creation and compositions, both of which are relevant to the proposed research. The panel found the goal of developing new theories on AI-accelerated creativity through creative performance projects novel and exciting. However, the panel found that the proposal did not sufficiently situate the research in the context of existing work on AI music co-creation systems.

Overall, the panel considers this proposal to be of good quality. However, based on the combined set of criteria used in the assessment it was not sufficient to be retained for Step 2. The panel therefore recommends that the proposal should not be retained for Step 2 and should not be considered for funding.

REVIEWER COMMENTS

The following individual reviews have been carried out independently prior to the panel meeting and do not necessarily reflect the panel's final opinion

Reviewer 1

Research Project

Ground-breaking nature and potential impact of the research project
The proposed research addresses the tailoring of AI co-creation for composers and the developing of a theoretical framework to describe the impact of AI co-creation on the compositional creative process. The outputs are demonstrated through a series of compositions and performances of these AI-co-created works.

The first WP is devoted to creating a co-composer AI tool. Several co-creative AI tools already exist, including ones that can be steered and trained on small, focused datasets like somax2 in the ERC project REACH that preserve the artistic nuances of individual, or a small number of artists.

The second WP, the more interesting part of the research, targets the analysis of the impact of co-creating with AI on the creative process to build a theory of AI-accelerated creativity. Discussions of acceleration and deceleration of cognitive processes uses existing frameworks for understanding human creativity.

Scientific Approach
The scientific approach for WP1 is based on implementing an AI co-composition tool, and WP2 draws from postdigital research. The final WP uses the tool to create new compositions (popular and contemporary) and stages performances of these new works. The actions outlined are feasible, with WP2 being the more likely to provide new knowledge.

Principal Investigator

Intellectual capacity and creativity
The PI is a music scholar and composer with experience in digital composition tools, postdigital science, and learning frameworks. The PI's outputs also include a number of compositions and installations.

Reviewer 2

Research Project

Ground-breaking nature and potential impact of the research project

The project proposes an innovative exploration of generative artificial intelligence (GenAI) in music composition, emphasizing the interaction between AI and human creativity. This initiative is timely, given the increasing integration of AI technologies in creative fields, which raises essential questions about authorship, emotional resonance, and the collaborative dynamics between human composers and AI systems. However, several critical aspects of the proposal warrant further elaboration to enhance its clarity and potential impact.

One of the project's primary objectives is to address the challenge of individual creativity through personalized GenAI tools that learn from a composer's unique creative data. While providing tailored support that fosters a more intimate collaboration between composers and AI systems is appealing, the proposal lacks specificity regarding how the emotional and creative intentions of composers will be effectively captured and integrated into the GenAI outputs. For instance, methods for measuring a composer's emotional state and translating that into actionable inputs for the AI remain unclear.

Furthermore, while the proposal acknowledges the importance of the sociocultural context, it does not adequately address the context-aware aspects of music composition. The role of context—such as cultural, social, and technological factors—should be explicitly defined and integrated into the research design. The proposal could benefit from a theoretical framework that incorporates these contextual dimensions, thereby enriching the exploration of the 'paradox of acceleration' mentioned in the project.

The selection of "professional composers" for data collection using the CoCo VST suite raises questions about the criteria for their inclusion. It is essential to clarify why these particular individuals were chosen and how their experiences may represent broader trends in the field.

The proposal currently leans heavily on the Western art music paradigm, which may overlook significant differences in music production and authorship in popular music contexts. Acknowledging these differences is vital for developing a comprehensive understanding of the complexities involved in AI-assisted music composition.

Scientific Approach

The project's three primary objectives—developing the Co-Composer (CoCo) VST suite, establishing the AI-ACT theoretical framework, and composing original works—are well-defined and timely. While the intention to disseminate findings through public concerts is commendable, it needs further clarification.

Principal Investigator

Intellectual capacity and creativity

The PI's excellent track record of relevant scholarly publications clearly demonstrate the ability to conduct ground-breaking research, creative independent thinking, and the expertise and capacity to successfully execute the project.

Reviewer 3

Research Project
Ground-breaking nature and potential impact of the research project The project is highly innovative in its nature. It touches on one of the most topical issues, that of AI: in this specific case applied to the field of musical composition. The project is ambitious and promises ground-breacking results, and extends the scope of compositional and musical practices currently underway. It includes relevant conceptual aspects, with references to the contemporary theoretical debate; at the same time, practical and concrete aspects that concern practical applications. The structure, the proposed articulation of the proposal are convincing. **Scientific Approach** The scientific approach outlined is concretely feasible in the proposed timeline and methods; this also in light of the ambitious goals of the project.

Principal Investigator
Intellectual capacity and creativity The PI's profile is very solid. In his activity as a composer, he has had the opportunity to demonstrate a strong tendency towards experimentation and innovation, also supported by a convincing and coherent theoretical and conceptual contribution. The PI certainly is able to direct the project and its development in a positive way.

Reviewer 4

| Research Project |
|---|
| **Ground-breaking nature and potential impact of the research project**
The scientific concept is innovative and responds well to current challenges in the industry, as well as more conceptual or even philosophical questions about authorship, collaboration, emotion in music. The project appears to go beyond the state of the art conceptually but also in the types of outputs it will deliver. The theory development coming from the project is likely to have an impact outside of the field of music and composition.

Scientific Approach
The approach is convincing and the different dimensions are already clearly defined. Development and testing will be done in a gradual way. The different risks have been mapped out in a confident way. One potential risk though is not really addressed, i.e. the way in which fast technological developments in this field will require constant updating and adapting in the research team. |

Principal Investigator
Intellectual capacity and creativity The PI has the right background for leading the project, with a background in composition and music. The candidate has a series of peer recognitions both academically and artistically, and is also familiar with the AI aspect of the project.
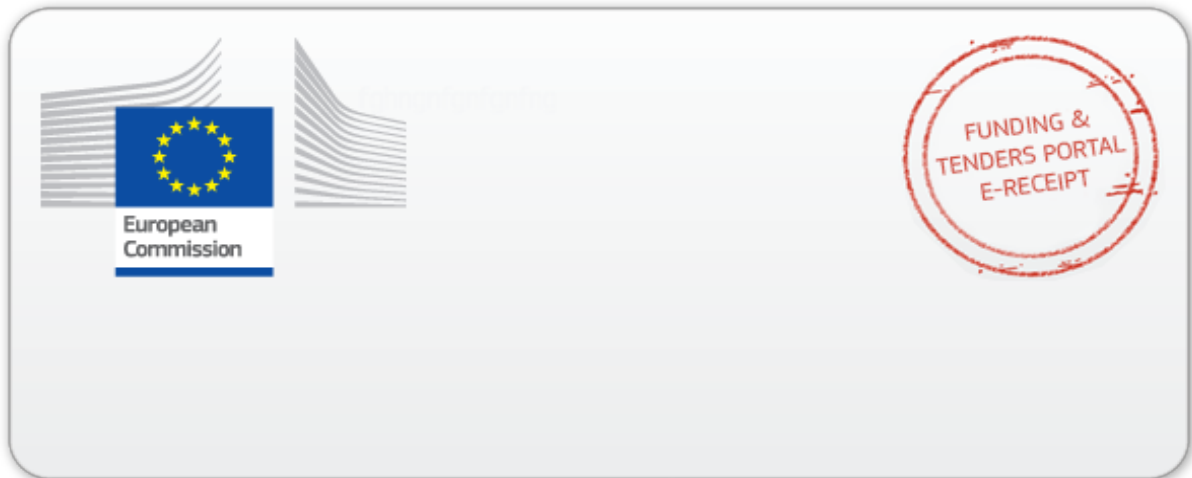
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