The ACTOR Project

Analysis, **C**reation, and **T**eaching of **OR**chestration

SSHRC Partnership Grant program

[we need a cool logo!]

Schulich School of Music
McGill University
5-7 July 2018
http://www.mcgill.ca/timbre2018

(followed immediately by ACTOR kickoff meeting
9-10 July 2018 – hopefully!)

Timeline for proposal

- Partnership meeting aims [3-4 Aug]
  - partner presentations to situate the scope of the partnership and envision inter-institutional interactions
  - refine global project structure
  - present and discuss basic features of Partnership Memorandum of Understanding (MOU)
  - define involvement and interaction of institutional Partners
  - develop 7-year timeline for activities
  - define governance structure
  - define knowledge mobilization goals and activities
  - define student training and mentoring opportunities (exchange travel and co-supervisions)

Timeline for proposal

- Send out invitations to co-applicants (CA), collaborators (CO) and institutional contact people (ICP) [14 Aug - done]
    - check ICPs on list (someone else can fill out)
    - instructions for acceptance procedure
- Determine institutional representatives (IR) for efficient communication (CA or CO) [28 Aug - done]
- CAs without CVs and COs accept invitations [by 15 Sep]
- 10 CAs need to complete SSHRC CVs, research contributions, relevant experience
    - Send to Stephen for OSR feedback [by 15 Sep]
    - Complete [by 30 Sep]
- MOU (Evidence of formal partnership)
    - draft to ICPs and IRs [28 Aug - done]
    - to be explicitly acknowledged in support letter [1 Oct]

Timeline for proposal

- Obtain consent of axis, sub-axis leads and co-leads [14 Aug - done]
- Full draft of proposal for feedback to IRs [7 Sep - done]
  - discuss with other members of your institution
  - collated feedback to McAdams [18 Sep]
- Revised draft of proposal to IRs, ICPs and McGill OSR [1 Oct]
- Draft letters of support with 7-year budget breakdown of institutional cash & in-kind contributions to McAdams [1 Oct]
  - feedback to ICPs [7 Oct]
  - upload final information to SSHRC website [15 Oct]
- Upload final proposal files to website [15 Oct]

Proposal structure

- Participants (accept invitation, CVs for CAs)
- Partners (accept invitation, upload support letter, enter commitments)
- Previous SSHRC funding from CAs (Canadian only) [1 p]
- Summary [1 p]
- Expected outcomes [1 p]
- Project description (more administrative than scholarly) [8 pp]
- Description of formal partnership [4 pp]
- Governance structure [2 pp]
- Participants' involvement [2 pp]
- Training and mentoring [1 p]
- Knowledge mobilization plan [2 pp]
- Evidence of formal partnership (MOU) [20 pp]
- Potential partners [1 p]
- Budget justification [4 pp]
- Contributions plan [3 pp]
- References [10 pp]

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Partners

- McGill Univ (McAdams*, Bourgogne, de Francisco, Depalle, Fujinaga, Guastavino, Hasegawa, Leive, Leroux, Rea)
- Ircam (Esling*, Agon, Assayag, Donin, Noisternig, Susini, Warusfel)
- UCSD (Steiger*, Puckette, Reynolds, Yadegari)
- Univ Calgary (Sallis*, Boyd, Eagle, Radford)
- Univ British Columbia (Hamel*, Pritchard, Tenzer)
- Univ Toronto (McClelland*, Britton, Lee, Newsome, Palej)
- Univ Montréal (Traube*, Bengio, Lavoie, Michaud, Normandeau, Rivest)
- HEM Genève (Cordero*, Daubresse, Jarrell, Naón)
- Hochschule für Musik Detmold (Hadjakos*, Berndt, Kob)
- Harvard Univ (Rehding*, Czernowin, Dolan, Tutschku)
- Southern Methodist Univ (Wallmark*)
- CNSMDP (Maresz*)
- Univ. Strasbourg (Schneider*, Michel)
- OrchPlayMusic (Bouliane*, Baril)
- Sonic Solveig/Les clés de l'écoute (Aliberti*)
- Applied Acoustics Systems (Verge*)
- Vibe Avenue (Dupas*)
- Orchestre symphonique de Montréal
- Compute Canada
- Independent (Goodchild [Queens], Haus [Milano], Lévy [Leipzig], Russo [Ryerson], Thoresen [NAM])

ACTOR Project Structure
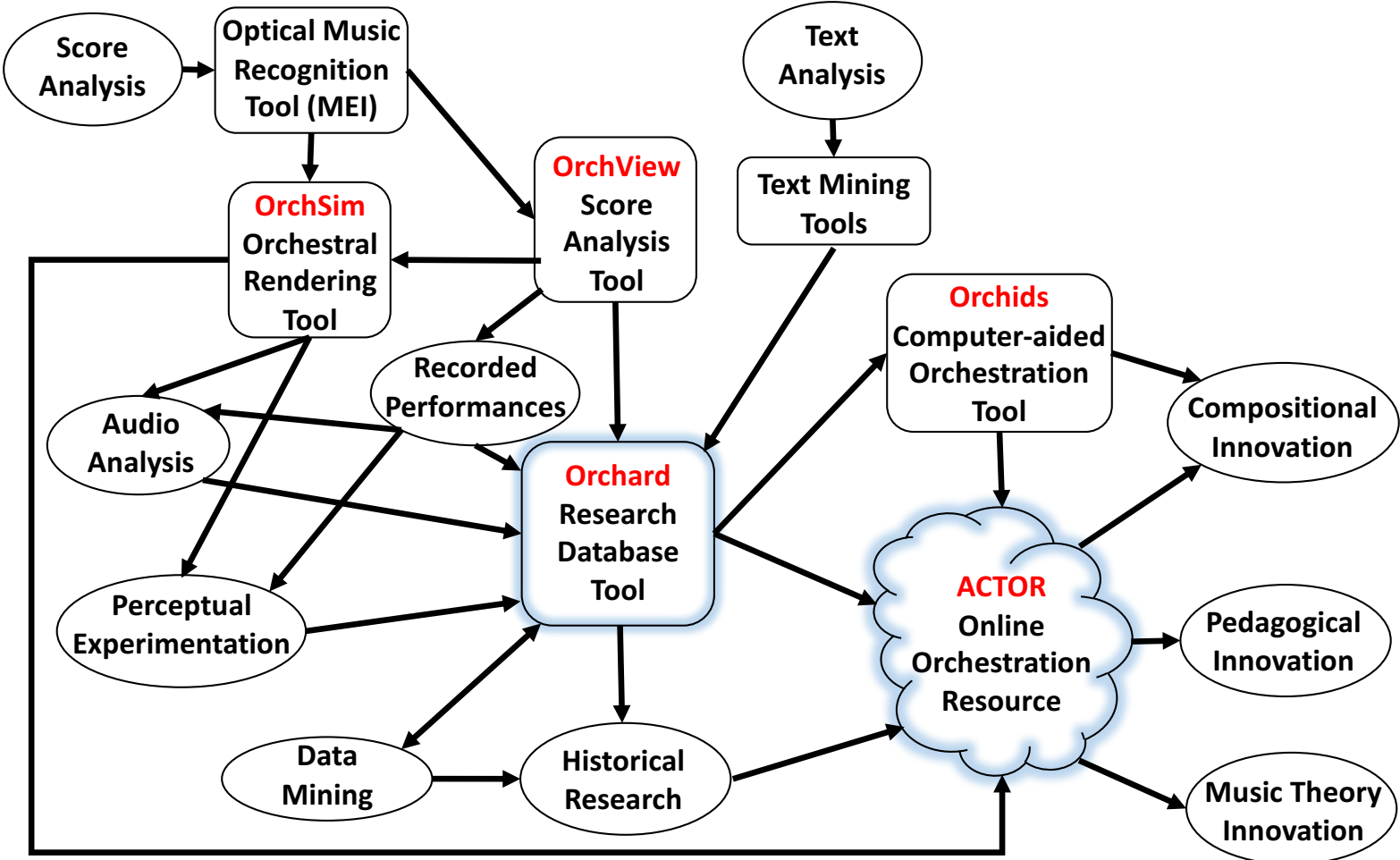
ACTOR Project Structure

ANALYSIS AXIS

Lead: McAdams

| Music analysis | Text analysis | Audio analysis | Perceptual analysis | Performance analysis |

TOOL DEVELOPMENT AXIS

Lead: Esling

| Orchestration analysis database | Generative tool development | ACTOR online orchestration resource |

OUTPUT INNOVATION AXIS

Lead: Hasegawa

| Pedagogical innovation | Innovation in music studies | Compositional innovation |

ANALYSIS AXIS

1 Music analysis

Lead: Sallis (UofC)
Co-lead: Dolan (Harvard)
Co-lead: Palej (UofT)
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a. Score annotations [Harvard, McGill, VibeAve]

b. Taxonomy of orchestration techniques and effects [McGill, VibeAve]

c. Automatic analysis of machine-readable scores [HfMD, IRCAM]

d. Aural analysis of sound-based and unnotated music [IRCAM, McGill, UBC, UCSD, UdeM, UofC, UofT]

e. Development of historically sensitive analytical methods [Harvard, HfMD, UofT]

f. Recompositions and reorchestrations for hypothesis testing [composers from CNSMDP, HEM, McGill, OPM, UBC, UCSD, UofT, VibeAve]

2 Text analysis

Lead: Wallmark (SMU)
Co-lead: Guastavino (McGill)
Co-lead: Traube (UdeM)
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a. Discourse analysis [McGill, Harvard, UofT]

b. Corpus linguistics [SMU, UdeM]

c. Text mining algorithms [IRCAM, SMU]

d. Critical organology [Harvard, IRCAM, McGill, SMU, UofT]

e. Affect analysis [McGill, SMU]

f. Linguistic expression of orchestration techniques and effects [Harvard, HEM, HfMD, IRCAM, McGill, OPM, SMU, UdeM, UofT]

g. Transdisciplinary, multilingual lexicon [HEM, HfMD, McGill, OPM, SMU, UCSD, UdeM, UofT]

h. Sound symbolism and cognitive semantics [Harvard, SMU]

3 Audio analysis

Lead: Depalle (McGill)
Co-lead: Boyd (UofC)
Co-lead: Verge (AAS)
Co-lead: Hamel (UBC)
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a. Computation of time-varying timbral descriptors on individual and combined audio tracks to model orchestration effects [HEM, HfMD, IRCAM, McGill, UBC, UCSD, UdeM]

b. Explore deep learning approaches to discover new descriptors [AAS, IRCAM, McGill, UdeM]

c. Time-series data mining to determine useful descriptors for modeling perceptual results [AAS, HEM, IRCAM, McGill, UBC, UCSD]

d. Derivation of symbolic representations from soundfield recordings [IRCAM, UBC, UCSD, UofC]

4 Perceptual analysis

Lead: McAdams (McGill)
Co-lead: Susini (IRCAM)
Co-lead: Reynolds (UCSD)
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a. Perception of orchestration effects outside of and within musical context [HfMD, IRCAM, McGill, OPM, SMU, UBC, UCSD, UdeM]

b. Formalization of perceptual principles implicated in orchestration [HEM, HfMD, IRCAM, McGill, UCSD, UdeM]

c. Emotional reactions to orchestration [HfMD, McGill, SMU, UBC, UCSD, UdeM]

d. Perception of different orchestrations or re-orchestrations of same piece [CNSMDP, HEM, McGill, UdeM]

e. Perceptual evaluation of computer-aided orchestration excerpts (live recordings vs. simulated renderings) [HEM, IRCAM, McGill, OPM, UBC]

f. Perception of effects of spatialization and performance interpretation on orchestration [HEM, HfMD, IRCAM, McGill, UBC, UCSD, UofC, UdeM]

5 Performance analysis

Lead: de Francisco (McGill)
Co-lead: Kob (HfMD)
Co-lead: Rivest (UdeM)
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a. Study musicians' use of timbre in music performance (blend and instrumental timbre as expressive tools) and genre-specific differences [HfMD, McGill, SMU, UdeM]

b. Characterization of how orchestration effects related to auditory grouping are represented in scores, conceived and communicated by conductors, performers, and producers and achieved in rehearsal and mixing [HEM, HfMD, IRCAM, McGill, UBC, UCSD, UdeM, UofT]

c. Modeling performance constraints on musical instruments for CAO and CAOR environments [AAS, HEM, HfMD, UBC, UCSD, UdeM, VibeAve]

d. Research ensembles linking composition, performance and improvisation to orchestration science and generating recordings for analysis and experimentation [HEM, McGill, UCSD, UdeM]

e. Effects of room acoustics & spatial disposition of acoustic and electroacoustic sources [CNSMDP, Harvard, HEM, HfMD, IRCAM, McGill, UBC, UCSD, UdeM, VibeAve]

TOOL DEVELOPMENT AXIS

6 Orchestration analysis database

Lead: Fujinaga (McGill)
Co-lead: Maresz (CNSMDP)
Co-lead: PDF1 (McGill)

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a. Scalable database with integrated:
   1) machine-readable scores (pitch, rhythm, dynamics, instrument, etc.) with annotations of perceptual effects, of orchestration practice techniques, of modes of playing, and of generic impressions and affects,
   2) descriptive texts, 3) audio clips (recorded and/or rendered), and 4) results of perceptual experiments [CNSMDP, McGill, OPM]

b. Optical music recognition of orchestral scores; validation by experts [McGill, OPM]

c. Development of open-access, domain-relevant data mining and machine learning analytic approaches [IRCAM, McGill]

d. Crowd-sourced analysis and evaluation framework (with peer-review à la Wikipedia) [HfMD, McGill, UCSD]

e. Integrate continuous metadata on acoustic properties and categorical properties of musical instruments into sound database [CNSMDP, IRCAM, HEM, McGill]

f. Computer-aided score and spectrogram annotation software for direct entry of analysis annotations into database [HfMD, McGill, UBC]

g. Score follower software to view score and selected annotations as music plays [HfMD, OPM]

7 Generative tool development

Lead: Esling (IRCAM)
Co-lead: Bouliane (OPM)
Co-lead: Hadjakos (HfMD)

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a. Extension of computer-aided rendering of musical scores to multi-track audio for perceptual studies, audio analysis and educational purposes [McGill, OPM]

b. Computer-aided orchestration problem-solving [HEM, IRCAM, McGill]

c. Computational creativity research toward real-time orchestration generation in applications for composition, post-production, live performance and improvisation [IRCAM, OPM, UofC]

d. Development of algorithms for performance constraints in orchestral simulation [AAS, HEM, HfMD, McGill, OPM, UBC, UofC]

e. Expanded existing technologies with room acoustics, spatialization of sound sources, instrument substitution possibilities [HfMD, UBC, UCSD, UdeM, UofC]

8 ACTOR online orchestration resource

Lead: McAdams (McGill)
Co-lead: Daubresse (HEM)
Co-lead: PDF2 (McGill)

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a. Project information and news [McGill]

b. Public discussion board for community feedback and engagement [McGill]

c. Bimonthly newsletter to subscribers [McGill]

d. Presentation of open-access tools [HEM, HfMD, IRCAM, McGill, OPM, UBC, UCSD, UdeM, UofC]

e. Meta-data on instrumentation and combinations: audio descriptors, sound clips, visualizations of various representations, projections of orchestration effects into descriptor spaces as exploration tool [AAS, CNSMDP, HfMD, IRCAM, McGill, OPM, UCSD, UdeM, UofT, VibeAve)

f. Pedagogical pages on orchestration issues explored in other sub-axes [CNSMDP, HEM, HfMD, McGill, OPM, Sonic Solveig, UBC]

g. Link to Orchestration analysis database (with login)

h. List of papers and conferences from scholarly output

i. Links to announcements of concerts/events and results (videos, sound files) of compositional output

j. Links to related projects at partner institutions

OUTPUT INNOVATION AXIS

9 Pedagogical innovation

Lead: Rea (McGill)
Co-lead: Cordero (HEM)
Co-lead: Aliberti (Sonic Solveig/
Les clés de l'écoute)
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a. Development of a principled theoretical framework for teaching orchestration practice with standardized vocabulary and guidelines for communicating with performers [CNSMDP, HEM, McGill, UBC, UdeM, UofC, UofT, VibeAve]

b. Development of multi-track listening tools to facilitate learning effects of instrument combinations [HfMD, IRCAM, McGill, OPM, UBC, UdeM, VibeAve]

c. Adaptation of computer-aided orchestration tools to classroom, evaluation of efficacy in pedagogical settings [HEM, HfMD, IRCAM, UBC, UdeM, UofC, UofT]

d. Development of pedagogical workshops/summer schools on orchestration practice, realization and science (teaching teachers) [McGill, UBC, UofC, UofT]

e. Development of composer/performer research ensembles for interactive problem solving [McGill, UCSD, UdeM]

f. Edutainment applications and community outreach events [McGill, OSM, Sonic Solveig/Les clés de l'écoute]

10 Innovation in music studies

Lead: Hasegawa (McGill)
Co-lead: Radford (UBC)
Co-lead: McClelland (UofT)
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a. Assemble a database of existing literature and historical documents on timbre [Harvard, McGill, SMU, UBC, UofT]

b. Development of a theoretical framework around timbre as form-bearing element in music [Harvard, McGill, SMU, UCSD, UofT]

c. Theorizing on role of timbre in perception of formal functions in music [Harvard, McGill, OPM, SMU, UCSD, UofT]

d. Theorizing on role of timbre in voice leading practice and perception [HfMD, McGill, UofC, UofT]

e. Theorizing on the interaction of timbre and harmony [HEM, HfMD, McGill, UBC, UdeM, UofC, UofT]

f. Development of principles for achieving, avoiding or weakening perceptual grouping goals [HEM, McGill, OPM, UBC, UCSD, UofC, UofT]

g. Historical analysis of orchestration style [Harvard, SMU, UofT]

h. Theorizing on the effects of performance on timbre [HEM, McGill, UCSD, UdeM]

i. Extension of timbre and orchestration theory to popular/non-Western musics [Harvard, SMU, UBC, UofT]

j. Studies of creative process in orchestration practice [IRCAM, UofC]

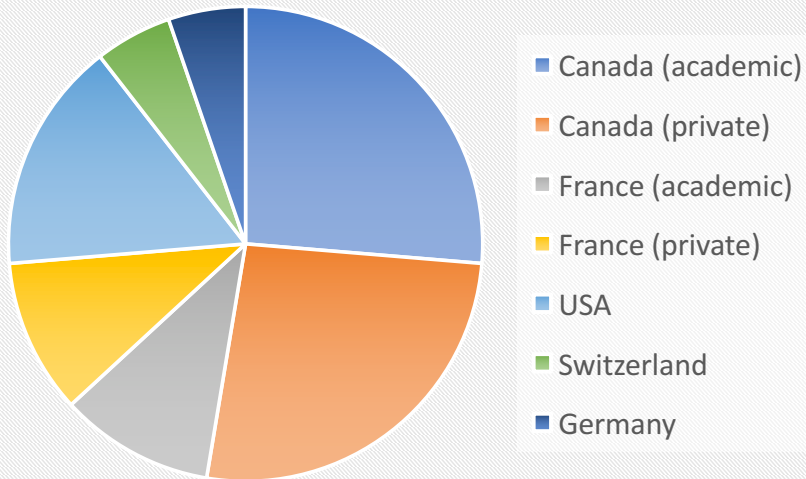k. Timbre and cultural theory (race, gender, identity) [Harvard, SMU, UofT]

11 Compositional innovation

Lead: Steiger (UCSD)
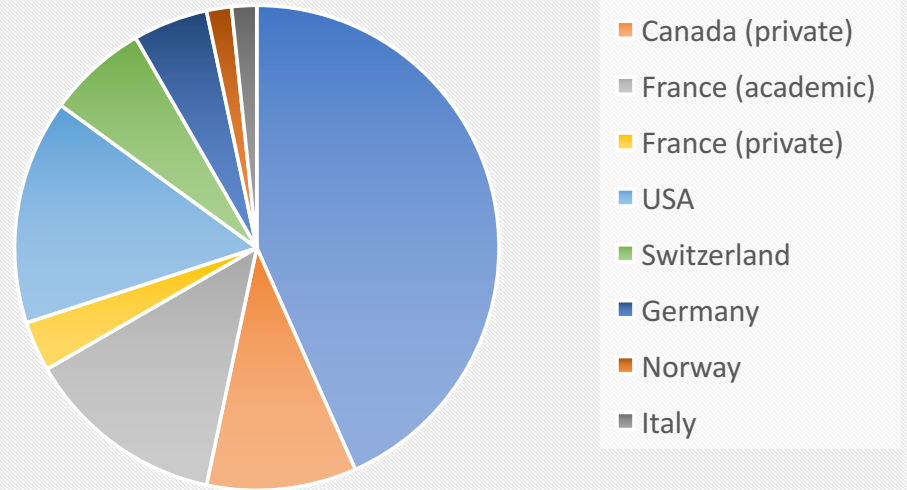Co-lead: Pritchard (UBC)
Co-lead: Britton (UofT)
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a. Deployment of composer/performer research ensembles for interactive problem solving with writings, recordings and lecture-concerts on results [Harvard, HEM, McGill, UBC, UCSD, UdeM, UofC, UofT, VibeAve]

b. Use of computer-aided orchestration environments [CNSMDP, Harvard, HEM, IRCAM, OPM, UBC, UCSD, UdeM, Uof C, UofT, VibeAve]

c. Exploration of the role of spatialization in instrumental and electroacoustic orchestration [CNSMDP, Harvard, HEM, HfMD, IRCAM, McGill, UBC, UCSD, UdeM, UofC, UofT]

d. Issues in blending and juxtaposing acoustic and electroacoustic sources in mixed orchestration [CNSMDP, Harvard, HEM, HfMD, McGill, UBC, UCSD, UdeM, UofC, UofT]
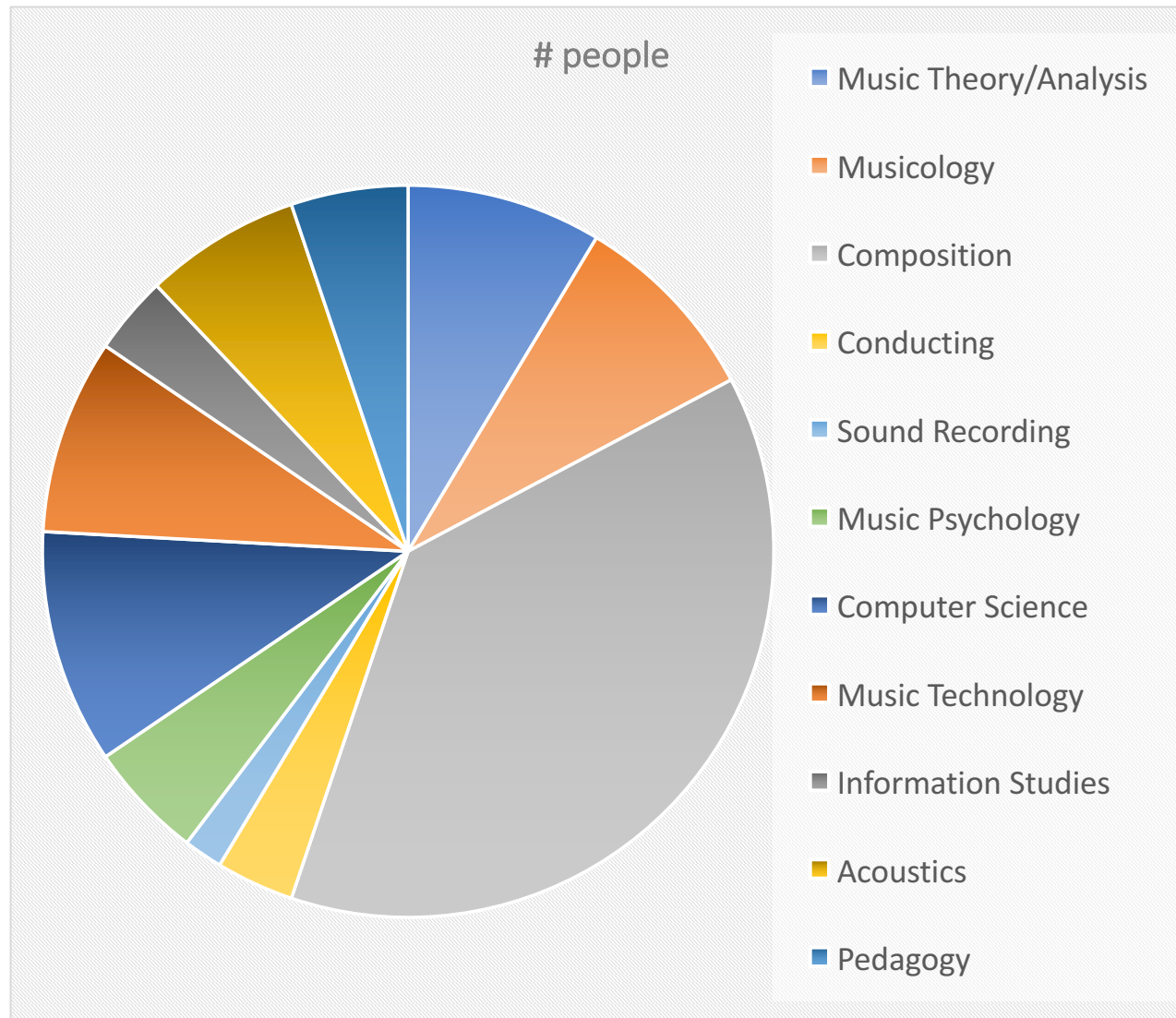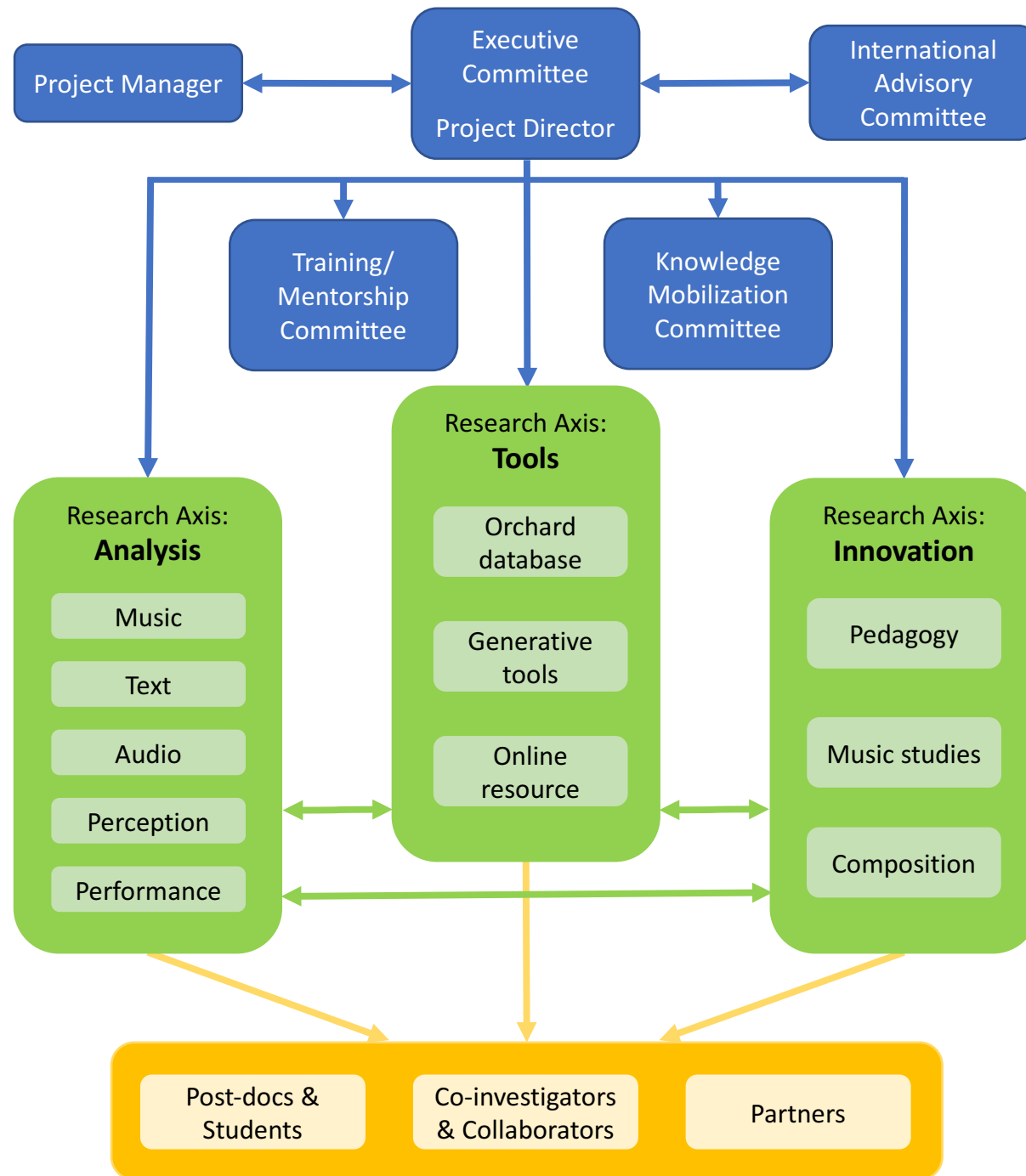
Geographical distribution

Disciplinary distribution

people

- Music Theory/Analysis
- Musicology
- Composition
- Conducting
- Sound Recording
- Music Psychology
- Computer Science
- Music Technology
- Information Studies
- Acoustics
- Pedagogy

Committee Comments

- Challenge – Very good to excellent throughout
  - General comment: more about how the project will engage with the broader public [Expected outcomes section]
- Feasibility – Very good to excellent except:
  - quality and genuineness of the formal partnership and associated management and governance arrangements and leadership, including involvement of partner organizations and others in the design and conduct of the research and/or related activities [Description of formal partnership section]
  - General comment: provide more details on the governance model for the partnership , more specifically on the decision making and conflict resolution processes [Governance structure section]
  - General comment: providing more information on the role of the main team members in the proposal, noting that most of the team members were listed as collaborators. [Participants' involvement section]
- Capability – Very good to excellent except:
  - experience in formal partnerships [Project description section]