MIP-Frontiers: New Frontiers in Music Information Processing[1]

First Training Week

https://www.upf.edu/web/mip-frontiers

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[1] This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 765068.

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Project Overview

H2020 – MSCA – ITN – ETN – MIP-Frontiers

- PhD Training Network for 15 Early Stage Researchers (ESRs)
- 4 Universities
- 3 Industry Beneficiaries
- 9 Partner Institutions
- Funding $\approx$ €4M[1]
- Emphasis on **training**, not just research
  - Cross-sectoral training for all students
  - Regular network-wide events
  - All partners contribute

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The MIP-Frontiers Proposal

... standard methods tend to be neither robust ... nor scalable ... To train a new generation of researchers who are aware of, and can tackle, these challenges, we bring together leading MIR groups and a wide range of industrial and cultural stakeholders to create a multidisciplinary, transnational and cross-sectoral European Training Network ... to contribute to Europe's leading role ... and accelerate the impact of innovation on European products and industry. The researchers will develop breadth ... in transferable skills, whilst gaining deep knowledge and skills in their own area of speciality. They will learn to perform collaborative research, and to think entrepreneurially and exploit their research in new ways that benefit European industry and society. The proposed work is structured along three research frontiers ... guided by ... industrial and cultural stakeholders in the consortium, which range from consumer electronics companies and big players in media entertainment to innovative SMEs, cultural institutions, and even a famous opera house ...

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Scientific Objectives

Aim: address issues of scaleability, robustness, and generalisability of current music information processing methods by development and integration of new data-driven, knowledge-driven, and user-driven approaches

- Investigate new theory and algorithms for audio signal processing and machine learning of music information
- Research the use of high-level musical knowledge and contextual information for solving hard music processing & recognition tasks
- Explore the use of direct & indirect user input about user context, behaviour and perception for music information processing
- Tackle real-world problems, esp. via industry partners
- Share research advances across network
- Disseminate to academic and non-academic audiences, via: publications, data, software, public engagement

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MIP-Frontiers Consortium

Beneficiaries

- QMUL: Centre for Digital Music, EECS, QMUL, London, UK
- UPF: Music Technology Group, Pompeu Fabra University, Barcelona, Spain
- TPT: Signal and Image Processing Department, Telecom Paristech, Paris, France
- JKU: Department of Computational Perception, Johannes Kepler University of Linz, Austria
- SONY: Sony Computer Science Laboratory, Paris, France
- DRM: DoReMIR Music Research, Stockholm, Sweden
- ROLI: Roli Ltd, London, UK

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Partners

- DZ: Deezer, France
- TC: Technicolor R & D, France
- AN: Audionamix, France
- NI: Native Instruments, Germany
- BMAT: BMAT, Spain
- KI: Karajan Institute, Austria
- TIDO: Tido Music, UK
- VSO: Vienna State Opera, Austria
- JAM: Jamendo, Luxemburg

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Agenda

Agenda: Thu 20 Sept (part 1)

- 8:30 Arrival, registration, coffee
- 9:00 Welcome & Introductions
- 10:00 Research planning 1: the big picture (Xavier Serra)
- 11.00 Coffee break
- 11:15 Research planning 2: the thesis proposal
- 12:00 Roles, responsibilities, rules and regulations (Simon Dixon)
- 13:00 Lunch

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Agenda: Thu 20 Sept (part 2)

- 14:00 Basics of IP (Emmanouil Benetos)
- 14:30 Introduction to Software Carpentry (Alastair Porter)
- 16:00 Coffee break
- 16:20 Communication, Introduction and obligations (Alvaro Bort)
- 16:35 Communication plan, communication actions (Xavier Serra)
- 16:40 Future Training meetings (Simon Dixon)
- 17:00 Goals for the week (Simon Dixon)
- 17:15 ESR meeting
- 17:45 Any Other Business
- 19:30 MIP-Frontiers Dinner – Chez Papa (near TPT)

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QMUL People

- Simon Dixon (Coordinator)
- Alvaro Bort (Project Manager)
- Mark Sandler (Supervisor)
- Emmanouil Benetos (Supervisor)
- Emir Demirel (QMUL1)
- Carlos Lordelo (QMUL2, based at DoReMIR)
- Ruchit Agrawal (QMUL3)
- Alejandro Delgado (QMUL4, based at Roli)
- Vinod Subramanian (QMUL5)

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Example PhD Student

Recent PhDs

- Yading Song, *The Role of Emotion and Context in Musical Preference*, 2016
- Shengchen Li, *Expressive Timing Analysis in Classical Piano Performance by Mathematical Model Selection*, 2016
- Rob Tubb, *Creativity, Exploration & Control in Musical Parameter Spaces*, 2016
- Magdalena Chudy, *Discriminating Music Performers by Timbre: On the Relation between Instrumental Gesture, Tone Quality and Perception in Classical Cello Performance*, 2016
- Tian Cheng, *Exploiting Piano Acoustics in Automatic Transcription*, 2016
- Siddharth Sigtia, *Neural Networks for Analysing Music and Environmental Audio*, 2017
- Siying Wang, *Computational Methods for the Alignment and Score-Informed Transcription of Piano Music*, 2017
- Zulfadhli Mohamad, *Estimating Performance Parameters from Electric Guitar Recordings*, 2018
- Maria Panteli, *Computational Analysis of World Music Corpora*, 2018
- Adib Mehrabi, *Vocal Imitation for Query by Vocalisation*, 2018

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Maria Panteli

- Background: SMC MSc at UPF; research in Byzantine chant and electronic dance music; several publications (inc. ISMIR and JNMR)
- Initial topic: *Signal Processing and Data Mining Tools for the Analysis of Musical Evolution*
- Supervisor: Matthias Mauch
- Very ambitious topic; had to address everything from MIR (audio features) to ethnomusicology
- Collected world music recordings from the British Library and the Smithsonian Institute
- Both audio and metadata were quite rough
- Valuable contributions in data cleaning
- Final topic: *Computational Analysis of World Music Corpora*
- Now working at the BBC

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Maria's Timeline

- Sep 2014: Starts PhD
- Dec 2014: Passes Research Proposal ("Stage 0")
- May 2015: Submits ISMIR2015 paper on evaluating features for world music – rejected
- Jun 2015: Passes Stage 1
- Sep 2015: Supervisor leaves QMUL for $Apple$
- Sep 2015: Submits ICASSP2016 paper – rejected
- Mar 2016: Re-submits ISMIR2015 paper in 2016 – Accepted!
- Mar 2016: Submits ISMIR2016 paper: *Learning a Feature Space for World Music Style Similarity* – Best Student Paper Award!!
- May 2016: 3-month research visit to NYU (Juan Bello's group)
- Oct 2016: Passes Stage 2
- Oct 2017: British Library Labs Research Award for *A large-scale comparison of world music corpora with computational tools*
- Dec 2017: Submits PhD thesis (defended March 2018)

Publications

- Panteli, M., & Dixon, S. (2016). On the evaluation of rhythmic and melodic descriptors for music similarity. ISMIR Conference (pp. 468-474)
- Panteli, M., Benetos, E., & Dixon, S. (2016). Learning a feature space for similarity in world music. ISMIR Conference (pp. 538-544)
- Panteli, M., Benetos, E., & Dixon, S. (2016). Automatic detection of outliers in world music collections. In Analytical Approaches to World Music (pp. 1-4)
- Panteli, M., Benetos, E., & Dixon, S. (2017). A computational study on outliers in world music. PLOS ONE, 12(12): e0189399
- Panteli, M., Benetos, E., & Dixon, S. (2018). A review of manually annotated and computational approaches for the study of world music corpora. Journal of New Music Research, 47(2): 176–189
- Panteli, M., Bittner, R., Bello, J.P., & Dixon, S. (2017). Towards the characterization of singing styles in world music. In IEEE International Conference on Acoustics, Speech and Signal Processing (pp. 636-640).
- Kedyte, V., Panteli, M., Weyde, T., & Dixon, S. (2017). Geographical origin prediction of folk music recordings from the United Kingdom. ISMIR Conference (pp. 664-670).

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Lessons

- Aim high
- Don’t give up when you hit setbacks
- Take change in your stride
- Share code and data
- Look for opportunities to collaborate

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Roles, Responsibilities, Rules and Regulations

Roles and Responsibilities of ESRs

- Delivery of the MIP-Frontiers project
- Research and write a PhD thesis in 36 months
- Responsible research and innovation: Ethics and integrity
- Dissemination: scientific publications, web site, social media, workshops, conferences
- Work exclusively for MIP-Frontiers
- Ensure visibility and recognition of received EU funding in all communications, publications and patent applications[1]
- Inform your employer as soon as possible of any events, circumstances or changes in status that might affect your work
- Submit an evaluation questionnaire and a follow-up questionnaire, at the end of your fellowship and two years afterwards

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Work Packages

- WP1-3 Research themes (grouping PhD projects)
  - WP1 Data-driven methodologies (UPF)
  - WP2 Knowledge-driven methodologies (JKU)
  - WP3 User-driven methodologies (TPT)
- WP4 Academic supervision (QMUL)
- WP5 Training (QMUL)
- WP6 Communication and dissemination (UPF)
- WP7 Management (QMUL)
- WP8 Ethics (QMUL/TPT)

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Deliverables (Academic)

- **D1.1 (M18):** State of art report: Data-driven MIP methodologies
- **D2.1 (M18):** State of art report: Knowledge-driven MIP methodologies
- **D3.1 (M18):** State of art report: User-driven MIP methodologies
- **D1.2 (M30):** Preliminary report of results
- **D2.2 (M30):** Preliminary report of results
- **D3.2 (M30):** Preliminary report of results
- **D1.3 (M42):** Final report of results
- **D2.3 (M42):** Final report of results
- **D3.3 (M42):** Final report of results
- Compiled from the ESRs' annual reports

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Deliverables (Training)

- **D4.1 (M8):** ESR project proposal report
- **D4.2 (M16):** ESR progress report (Stage 1)
- **D4.3 (M28):** ESR progress report (Stage 2)
- **D4.4 (M40):** ESR progress report (Stage 3)
- **D4.5 (M45):** ESR thesis submission
- **D4.6 (M48):** ESR thesis defence
- **D5.1 (M6):** First training week
- **D5.2 (M11):** Summer school
- **D5.3 (M16):** Second training week
- **D5.4 (M21):** Sandbox
- **D5.5 (M35):** Third training week

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Deliverables (Dissemination)

- **D6.1 (M2):** Web site and social media launch
- **D6.2 (M12):** Data management plan
- **D6.3 (M12):** Dissemination and public engagement plan
- **D6.4 (M28):** First workshop
- **D6.5 (M40):** Final workshop
- **D6.6 (M48):** Dissemination report

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Deliverables (Management)

- **D7.3 (M1):** Kickoff meeting and supervisor training
- **D7.2 (M1):** Recruitment of project manager
- **D7.1 (M2):** Signing of consortium agreement
- **D7.6 (M2):** Establishment of supervisory board
- **D7.4 (M12):** Recruitment of all ESRs
- **D7.7 (M13):** Progress report
- **D7.5 (M48):** End of project meeting
- **D8.1 (M12):** Ethics report 1 (H)
- **D8.2 (M12):** Ethics report 2 (POPD)
- **D8.3 (M12):** Ethics report 3 (DU)

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Responsible Research and Innovation

Six Keys to RRI

- Engagement of all societal actors (researchers, industry, policy-makers and the civil society)
- Gender Equality in human resources management and in R&I content
- Quality Science Education for the next generation of researchers
- Open Access to research results of publicly-funded projects
- Ethics as a basis for increased social relevance and acceptability of research
- Governance: actions to mainstream RRI principles within organisations.

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Scientific Integrity and Ethics

- Principles: reliability, honesty, respect, accountability, objectivity, impartiality, open communication, duty of care, fairness and responsibility for future science generations
- Openness and transparency (e.g. reproducible research)
- Research should benefit society
- Consideration of impact (intended and unintended) of all research
- “The dignity, rights, safety and well-being of human participants must at all times be considered, respected and safeguarded” (U.Manch.)
- Universities all have ethics committees that assess planned research
- All research involving human participants or human data must be subjected to scrutiny of the ethics committee

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Ethics

Persons carrying out research tasks must:

- present their research goals in an honest and transparent manner
- design the research carefully and conduct it in a reliable fashion
- use appropriate techniques and methodologies (including for data management)
- exercise due care for the subjects of research
- ensure objectivity, accuracy and impartiality while disseminating
- make the necessary references
- refrain from plagiarism, data falsification or fabrication
- avoid double funding, conflicts of interest and misrepresentation of credentials

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Ethics Examples in MIP-Frontiers

- Human participants
  - E.g. MRI scans, listening tests
  - Ensure informed consent, incidental findings policy
- Data protection and privacy
  - E.g. audio recordings of people, participant records
  - Personal data securely stored / anonymised
  - Comply with data protection laws (GDPR) etc.
- Dual uses
  - Potential for military/terrorist applications
  - Develop strategy, c.f. “Responsible Innovation”
- Support: local, Ethics Committee (TPT), Ethics Advisor (at QMUL)

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Ethics Strategy

- Education: training on ethics
- Pre-analysis of research by supervisors for ethics implications, e.g. humans or dual use
- Dissemination: consider security implications
- Supervisory Board: ethics as standing item on agenda
- Ethics Committee: discusses ethical issues, reports to SB
- Required by European Commission:
  - **Copies of ethics approvals to be submitted to REA**
  - Ethics Advisor report included in periodic reports
- See also the *European Code of Conduct for Research Integrity* and `http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/ethics_en.htm`

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Dissemination

Dissemination and Outreach/Communication

- An “Open Training Network”
  - Where possible, release documents, procedures, reports
  - Exceptions: personal data protection, IP/commercial confidentiality, copyright material, etc.
- Communicate widely with the research community, other stakeholders and the general public
- Use the MIP-Frontiers web site, blogs, social media, etc. to spread the word
  - `https://www.upf.edu/web/mip-frontiers`
- Everyone will be able to add publications, events, resources, and write on the blog(s)
- Discuss responsibilities at ESR meeting

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Dissemination

- Journal papers
- Presentations at international conferences
- Workshops
  - M28: Presentation of first results
  - M40: Presentation of final results
- Patent applications
- Outreach activities

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Outreach

- Purpose:
  - Attract young people to scientific careers
  - Highlight mobility of researchers
  - Contribute to better gender balance in Science
- Example activities:
  - Interviews / press releases
  - Work with professional bodies (e.g. ISMIR, IEEE, EURASIP)
  - Website, newsletter, social media, annual report

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Network-wide Outreach

Example activities:

- Publish and update project outlines on website
- Record podcast on research, for general audience
- Give public talks (as part of outreach training)
- Be Marie Curie Ambassadors
  - at local schools and/or university Open Days
- Come up with your own outreach activities

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ESR-inspired outreach

- To be discussed at ESR forum
- Starter ideas include:
  - Demonstration at open day / science festival
  - “Hack day” for undergraduate students
  - Contribute to accessible Wikipedia entries
  - Article for local newspaper
  - Work with an artist to create a new artefact (e.g. sound art) based on research

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Training and Network Events

Training

- Network-wide training events (all ESRs must attend)
- Individual-level training: at host institution
- Secondments

Features

- Open science, reproducible research
- Towards professional accreditation as researcher-engineers
- Open training network: sharing of best practice

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Network-Wide Training

- Annual training weeks: transferable skills
  - e.g. Research engineering: software carpentry & data management
  - Personal, professional and career
  - Project, dissemination, open science
  - Completion, grants, business pitching
- Summer school: scientific topic training
- Collaboration workshop (“sandpit”)
- 2 research workshops: presentation of research
  - (coinciding with progression points)

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Network-Wide Training Events

As stated in proposal (details subject to change):

Training Event	**Host**	**Month**
First Training Week	QMUL	6
Summer School	TPT	11
Second Training Week	DRM	16
Sandbox	UPF	21
First Workshop	JKU	28
Third Training Week	SONY	35
Final Workshop	TPT	40

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Individual-Level Training

- Individually planned, at host institution
- Personal Development Planning (PDP)
- Contribute to
  - Researcher Development
  - Engineering Competence
- Monitor PDP using points-based process

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Researcher Development

- Based on the Vitae Researcher Development Framework (RDF, `www.vitae.ac.uk`)
- Four quadrants:
  - a: Knowledge and Intellectual Abilities
  - b: Personal Effectiveness
  - c: Research Governance and organisation
  - d: Engagement, Influence and Impact

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Engineering Competence

- Professional Researcher-Engineers
- Demonstrate competence for Eur-Ing / CEng
- E.g. UK-SPEC3 areas:
  - A: Use general & specialist engineering knowledge in application of existing and emerging technology
  - B: Apply methods to analysis & solution of engineering problems
  - C: Technical and commercial leadership
  - D: Effective interpersonal skills
  - E: Commitment to professional standards, obligations to society, profession & environment

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Secondments

- Experience of different sector
  - Academic $\leftrightarrow$ Non-academic
- Collaboration with other researchers
- Understand their problems, how they think, how they work

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Personal Training (ESRs)

- Supervision team
  - Primary supervisor, Network Supervisor, Monitor
- Formal monthly meeting with supervisor
- Annual progress reviews
  - Against training targets

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PhD Project Milestones

- Project Proposal (M+3 $\approx$ M9)
  - Project feasibility, initial plan, skills required
- Stage 1 (M+9 $\approx$ M15)
  - Progress review, update/refine research plan
- Stage 2 (M+21 $\approx$ M27)
  - Novelty review, plan of final stage
- Stage 3 (M+34 $\approx$ M40)
  - Final review, thesis draft

Detailed timing may be adjusted to match local PhD regulations

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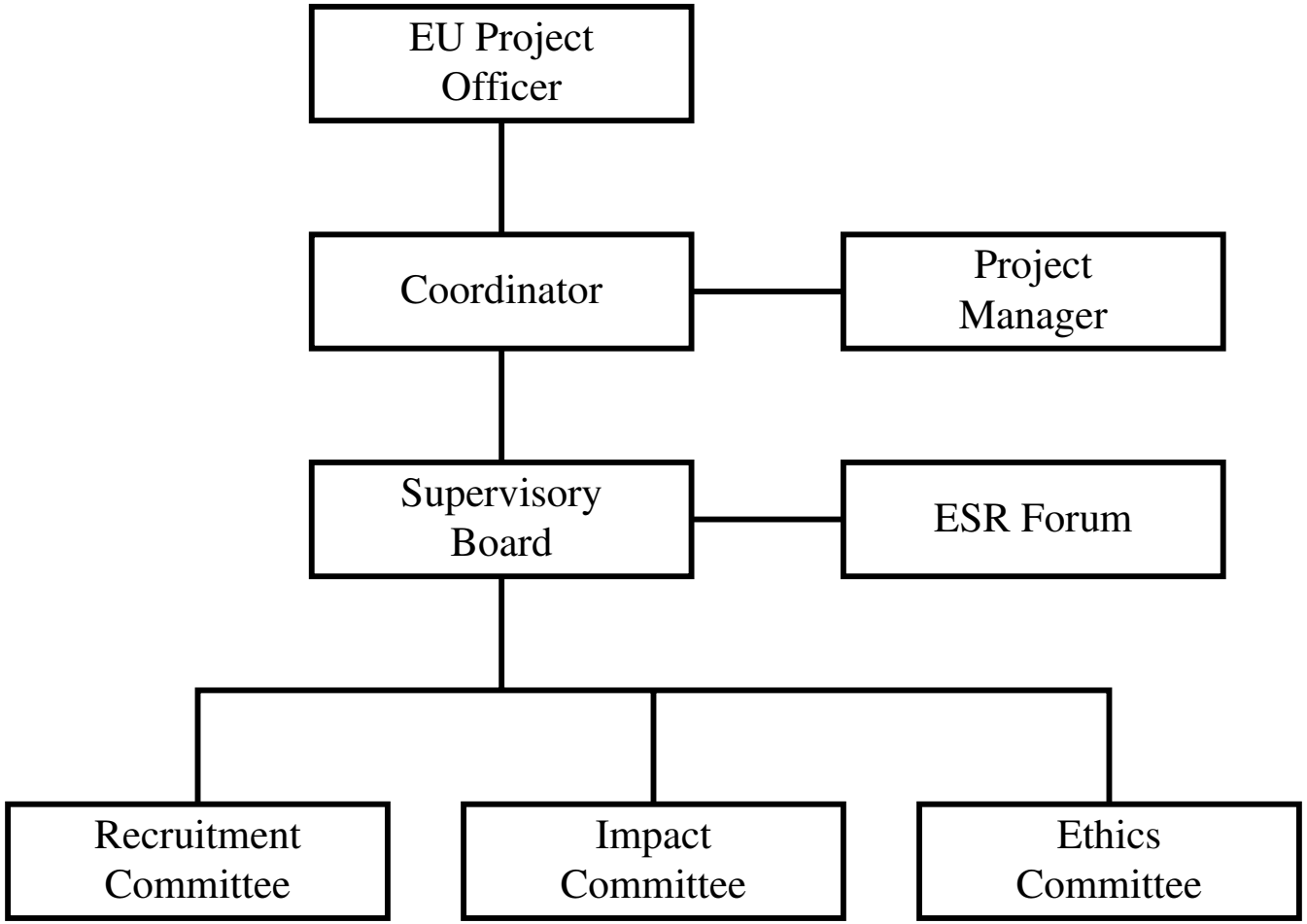
Management

Management Structure



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Supervisory Board (SB)

- Purpose:
  - Make strategic decisions
  - Handle changes to project plan & schedule
  - Monitor overall progress of ESRs
  - Monitor training progress reports
- Membership:
  - One member from each Beneficiary and Partner
  - Rotating elected ESRs
- Frequency:
  - Every 6 months approximately
  - Normally at network events

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ESR Forum

- Independent forum for ESRs
- Elect ESRs to SB
- Draft and present proposals to SB
- Additional training purposes:
  - Experience of meeting/committee organisation
  - Discussion of outreach activities

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Impact Committee

- Consider dissemination and outreach
- Review potential for exploitation of IP
- Balance academic “Open Science” against commercial confidentiality and IP protection

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Ethics Committee

- Consider ethics issues arising/anticipated during research
- Every ESR in at least one meeting of EC
- See previous slides on Ethics

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Goals for the week

Goals for rest of the week

- Learn about MIR
- Get to know the MIP-Frontiers team
- Networking with the wider research community
- Attend all sessions incl. HAMR, tutorials, papers and posters
- (Invidually) Identify 3 papers in the main conference
  - The 2 most relevant to your PhD topic + 1 other paper that interests you
  - Write a summary of each paper
  - Talk to the author about the work at the poster session
  - Collate summaries into a “Highlights of ISMIR 2018” blog
- (As a group) Produce a brief “state-of-the-art summary of MIR, based on what you have seen at ISMIR
  - e.g. develop with google docs, post final version on our web site

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ESR Meeting

AOB

Dinner

Management Meeting – Fri 21 Sept

Agenda: Fri 21 Sept

(while ESRs $\longrightarrow$ HAMR)

- 9:00 Recruitment update (Andi)
- 9:15 Administrative details (Alvaro)
  - ESR, mobility, family, contracts, Researcher Declarations, secondment agreements/details
- 9:45 Next steps (Simon)
  - Personal/career development plans, data management plans, Supervisory Board
- 10:15 Deliverables (Simon)
- 10:45 Planning for next meetings (Simon)
  - Research Proposals and DMRN London 17-18 Dec 2018
  - Spring School April 2019 TBC
- 11:30 Any Other Business
- 12:30 Lunch

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Next steps

- All ESRs to receive: Grant Agreement, DoA, MSCA Information Pack
- Researcher declarations required for each ESR within 20 days of recruitment
- Supervision teams for each student
- Research proposals
- Personal/career development plans
- Data management plans
- Supervisory Board

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Deliverables

Delivered Deliverables

- **D7.3 (M1):** Kickoff meeting and supervisor training
- **D7.2 (M1):** Recruitment of project manager
- **D7.1 (M2):** Signing of consortium agreement
- **D7.6 (M2):** Establishment of supervisory board
- **D6.1 (M2):** Web site and social media launch
- **D5.1 (M6):** First training week

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Next Deliverables

- **D4.1 (M8):** ESR project proposal report
- **D5.2 (M11):** Summer school
- **D6.2 (M12):** Data management plan
- **D6.3 (M12):** Dissemination and public engagement plan
- **D8.1 (M12):** Ethics report 1 (H)
- **D8.2 (M12):** Ethics report 2 (POPD)
- **D8.3 (M12):** Ethics report 3 (DU)
- **D7.4 (M12):** Recruitment of all ESRs
  - but this should be much sooner
- **D7.7 (M13):** Progress report

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Next meetings

MIP-Frontiers Meeting and DMRN Workshop

- Day 1 (Mon 17 Dec): MIP-Frontiers meeting
  - Presentation and evaluation of research proposals
  - Research data management (Data management plan)
  - Software carpentry 2 (do we need more?)
- Day 2 (Tue 18 Dec): DMRN workshop
  - Public workshop with oral and poster presentations (no proceedings)
  - ESRs to organise (with support from Alvaro)

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Spring School

- Nominally M11, shift to M13 (April 2019)
- Coincide with Mid-Term Review meeting
  - Takes place after submission of progress report
  - Assesses recruitment and deviations from plans
- Planned topics:
  - Research data management $\longrightarrow$ to M8 meeting
  - Music Theory (DRM)
  - Big Data (inc software carpentry) (UPF)

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