

<b>Institution: University of Surrey</b>
<b>Unit of Assessment: UOA 33 Music, Drama, Dance, Performing Arts, Film and Screen Studies</b>
<p><b>1. Unit context and structure, research and impact strategy</b></p> <p><u>Context</u></p> <p>In 2020 Music and Sound Recording at University of Surrey marked its 50<sup>th</sup> anniversary as a research-based department built on the mutual enrichment of the arts and sciences. During the REF2021 assessment period, and after the University disbanded the School of Arts, the Department of Music and Media (DMM) was re-constituted to expand on this longstanding Music and Sound Recording base. It did so in recognition of the dynamically changing and merging worlds of creative arts theory and practice, sound engineering, and digital technologies in the 21<sup>st</sup> century, and through strategic investment in infrastructure and people (staff and PGR communities), industry partnerships, and targeted research income streams.</p> <p>Research activity in DMM has grown since 2013 to encompass interlinked fields in acoustic-, spatial audio-, and video-engineering, sound art, media informatics, digital media arts, and music. It leads the international research agenda through:</p> <ul style="list-style-type: none"> <li>a) pioneering Research-Council-funded work in             <ul style="list-style-type: none"> <li>(i) psychoacoustics and spatial audio in their development from experimentation, through engineering, to industry application and artistic expression</li> <li>(ii) life-changing exploration of assistive digital media for health and society</li> </ul> </li> <li>b) the founding and steering of a worldwide network of creative practice research centred on the guitar</li> <li>c) musicological work of global excellence in 19<sup>th</sup>- and 20<sup>th</sup>-century music: Mahler studies, British music, screen music (and intermedial studies), biography and autoethnography</li> </ul> <p><u>Structure</u></p> <p>DMM's research landscape builds around four interrelated fields of international excellence, each represented by Professorial staff and an associated Research Centre through which a proportion of the research is focussed:</p> <p><b>Sound Recording (SR) and Video Technology (VT)</b></p> <p><i>The Institute of Sound Recording (IoSR)</i> (founded 1998, headed by Brookes) pursues world-class research in psychoacoustic engineering, offers research-based MPhil/PhD programmes, and hosts the globally recognised Tonmeister® BMus in Music &amp; Sound Recording. Alongside VT research in video processing, audiovisual transmission and display, SR engage in state-of-the-art interdisciplinary research combining acoustics, human perception, signal processing, computer science, and business.</p> <p><b>Media Informatics and Digital Media Arts (DMA)</b></p> <p><i>The Digital World Research Centre (DWRC)</i> (founded 1998, headed by Frohlich) undertakes socially beneficial interdisciplinary research projects through collaborations internally with Centre for Vision, Speech and Signal Processing (CVSSP), Electronic Engineering, Hospitality and Tourism Management (SHTM), Psychology, Health and Medical</p>

Sciences, Translation Studies, and Business, as well as externally with universities in Brazil, to study the creation, consumption, and technological enhancement of digital media.

## **Music**

### **Composition, Performance and Sound Art**

*The International Guitar Research Centre (IGRC)* (founded 2014, headed by Goss and Mermikides, Hon. President John Williams OBE; see impact case study (ICS) 'International Guitar Research Centre: Innovations in 21st-Century Guitar Theory and Practice') is the world's leading hub for guitar research, supported through a global network of partners: Guitar Foundation of America, HK Academy for Performing Arts, Altamira Foundation (China), International Guitar Research Archive (CSUN, USA), 21st-Century Guitar (Canada, Portugal), International Guitar Foundation (London), EuroStrings (EU).

## **Musicology**

*The Institute of Austrian and German Music Research (IAGMR)* (founded 2018, headed by Barham, Hon. President Erik Levi (RHUL)), provides a forum for renewed scholarly investigation of Austrian and German musical culture, supported by an international Advisory Board of 21 distinguished scholars and cultural curators from Europe and the USA.

### Research and impact strategy

Through interrelated research in sound, music, and image, DMM realised its objective during the REF2021 period to produce world-leading (inter)disciplinary research outputs — written, creative, technology- and science-based — that advance artistic/scientific, theoretical/practical, and contemporary/historical knowledge and understanding, generating demonstrable socio-cultural impact, and cutting-edge industry application.

DMM's research is configured for multiple forms of impact: from patents and engineering applications (IoSR), to material improvements in societal wellbeing (DWRC), and creative enrichment and cultural understanding through compositional and musicological engagement (see ICSs: 'International Guitar Research Centre', and 'New Directions in Spatial Audio Art').

These strategic developments have successfully met the REF2014 aims:

***'To strengthen, build and nurture links with regional, national and international partners'***

***'To expand and intensify the research activity in contemporary creative practices'***

***'To sustain systematically the production of outputs of high quality'***

***'To increase student numbers and consolidate the quality of ... PGR activity'***

DMM has facilitated this impact through strategic staff and PGR recruitment, internal and external support (research leave, mentoring, funding, and logistics), and investment in physical and cultural research infrastructure, thereby positioning itself at the forefront of constituent and combined specialisms in music and media arts and sciences.

Interdisciplinary, internationally collaborative, and open-access mindsets, essential to DMM's ethos, integrate research across specialisms: primarily that of Myatt (a leading authority in spatial audio engineering and aesthetics — see ICS 'New Directions'), De Sena (data sonification), Frohlich (digital technologies and health), Mermikides and Hall (science-based and

algorithmic creative practice). Work in cognitive film theory, screen music studies, and contemporary media design (Poulaki, Barham, Weinbren) similarly complements the industry and engineering foci of video production research.

### Evidence of achievement and impact

#### *Sound recording and video technology*

Discipline-heading research in these areas is disseminated through international conferences, leading journal or book publications, and industry collaborations. Brookes, Coleman, and De Sena have produced over 70 co-authored outputs (55 open access; *JAES*, *The Journal of the Acoustical Society of America*, *Applied Acoustics*), with Mason, staff across Surrey Schools, external and international collaborators, and postdoc researchers.

The IoSR has led/collaborated on 10 research projects, including the €3M EC H2020-funded 'Audio Commons' project, whose timbral prediction algorithms gained significant commercial take-up; and the £5.4M EPSRC-funded 'S3A Future Spatial Audio' project, whose Media Device Orchestration system has been used by the BBC.

Myatt's research unites technical and artistic insights in spatial audio to produce installations with global impact in urgent fields of conservation (see Myatt ICS). De Sena and Mermikides collaborate, through programming and music technology, with the Telethon Institute of Genetics and Medicine (Italy) on the 'Covid-19 Listening Project' in data sonification, deepening communicative understanding of the virus's phylogenetic tree.

Focussing routes to impact, and '**strengthen[ing], build[ing], and nurtur[ing] links with regional, national and international partners**' (REF2014), IoSR and VT groupings have further developed collaborative research links:

- a) **internally** with Engineering and Computing Departments at Surrey, CVSSP (H2020-funded 'Audio Commons' and EPSRC-funded 'S3A' projects) and Business School ('Audio Commons Project')
- b) **externally** with:
  - (i) industry: BBC R&D ('S3A', 'Audio un-mixing'), Wolfson Microelectronics, Cirrus Logic ('Microphone quality metering and enhancement'), Bang & Olufsen ('Towards objective assessment of spatial audio quality of loudspeaker-based systems in cars', 'Sound quality evaluation and modelling for domestic AV reproduction systems')
  - (ii) HE/cultural organisations and events:
    - Universitat Pompeu Fabra, Queen Mary University of London (QMUL) ('Audio Commons'); Universities of Southampton, Salford ('S3A'), Swansea (Coleman, EPSRC-supported 2018 CHERISH digital economy crucible)
    - **(Myatt sound art installations):** ZKM (Germany), MoMA (NY), NY Dept. of Transport, Tate Modern, MONA (Australia), GES-2 Gallery (Moscow), Le Fresnoy Audiovisual Research Centre (France), Art Basel (Miami), EMPAC (USA), Norwegian National Art Gallery (Oslo). **(Software implementations of De Sena's Scattering Delay Network (SDN), and Perceptual Soundfield Reconstruction (PSR)):** Click Festival (Denmark), Christie's (NY), Guildhall Art Gallery, RADA, V&A Museum, Playlines AR Studio, Mixed Immersion 3D Audio Company, Kimatica Art Studio, The Royal Society

Patents have been granted and commercial applications derived from the IoSR research projects listed above as well as from 'Perceptually Optimised Sound Zones': see Section 4 below.

#### *Media Informatics and Digital Media Arts*

DWRC has managed 13 funded projects (EPSRC, Digital Economy, Innovate UK) structured around direct public-facing impact, beginning with the Composers Notebook (Com-Note), and focussing on 'assistive media': UK-Brazil network on Assistive Media for Health and Wellbeing in Ageing, Next Generation Paper, Augmented Reading and Writing Experiences, Immersive Sound and Image to Depict Experiences of Blindness, New Media Innovation in Journalism, Creative M-Learning Technology for Rural Malaysia.

Also working '**to strengthen, build and nurture links with regional, national and international partners**', the UK-Brazil network on Assistive media, for example, in collaboration with University of São Paulo (USP) and Federal University of São Carlos (UFSCAR), combines multiple research strands across these institutions to implement real-world therapeutic uses of digital media for enhancing mental health and wellbeing in elderly populations.

Funded by EPSRC ('Content creation and consumption in the digital economy' call), the £1.17M Next Generation Paper project (in collaboration with SHTM and others at Surrey, Exeter and Open Universities, and industry partners HP, Otava Publishing, Ifolor Photo Printing, and Novacentrix) developed novel paper materials with embedded sensors allowing internet interactions via hyperlinks, creating new technology and business opportunities in the publishing and tourism industries.

Design and application of DWRC's new technology prototypes are further described in Section 4. below.

#### *Music*

Music research in creative-practice, cross-medial, technological, and critical-theoretical areas supports five degree programmes, and achieves the REF2014 goals '**To expand and intensify the research activity in contemporary creative practices**', '**To sustain systematically the production of outputs of high quality**', and '**To strengthen, build and nurture links with regional, national and international partners**'.

##### a) Composition, Performance and Sound Art

Research has expanded in range of impact to combine acoustic, electronic, and computer-based work (Goss, Mermikides, Armstrong, Hall), new ground in guitar studies (Goss, Mermikides) composer-performer collaboration, revision, notation (Armstrong), data sonification, rhythmic cognition (Mermikides), and spatial audio (Myatt).

The IGRC has generated a discipline-shaping body of new works, performances, recordings, international conferences (most recently in Hong Kong, 2019), papers, broadcasts, pedagogical and archival activity. Its research leads and impacts globally on ideas of acoustic resonance in guitar composition and performance, redefining the guitar as concerto instrument (Goss's internationally renowned output of solo, chamber and concerto works for Guitar and, as a world-first, Theorbo), and rhythmic expression/micro-timing, contemporary digital technologies, and

improvisational strategies (Mermikides's creative explorations of classical guitar and electronics, and analytical study of jazz time-feel (*Jazz Perspectives*, 2020)).

Together with the creative and musicological activities of composers Armstrong and Hall (musical revision, collaboration, borrowing, algorithmic composition, studies of Birtwistle and Feldman), this work epitomizes DMM's commitment to strengthening impact through interdisciplinarity and plurality in its creative-practice research, and diversity of output formats. Notated, electronic, or computer-mediated works (individually and collaboratively realised), audiovisual installations, investigatory practice-based projects, written/spoken, paper/online research papers and publications together maximise the reach and impact of collective creative-practice activity.

#### b) Musicology

Research in musicology leads agendas in established and developing areas of (inter)disciplinary scholarship: respectively, music analysis or critical/cultural musicology, and autoethnography or intermediality. Successfully achieving the REF2014 goal '**To sustain systematically the production of outputs of high quality**', this strategy is enabled by and exemplified in:

- grant acquisition from AHRC, BA, RMA, IMR, (Leverhulme, AHRC bids under review/for submission in 2020–21)
- dissemination at world-leading conferences (AMS, IMS, RMA, ICMSN, IASPM), invited research seminars at the Universities of Oxford, Cambridge, Edinburgh, Vienna
- hosting of 10 international conferences (including ICMSN 2017)
- outputs placed with sector-leading journals (*Musicae Scientiae*, *M&L*, *NCMR*, *MQ*, *CMR*), and publishers (OUP, CUP, MIT Press, Routledge, Lang, Palgrave Macmillan, Bloomsbury, Boydell & Brewer, with further contracts at CUP, OUP, Routledge, Indiana UP, Bloomsbury)

Focusing on historical, cultural and analytical study of Western 'art' music, popular music, jazz, and screen music, alongside performance studies, intermediality, critical theory, and autoethnography, the core strengths and impact of this research lie in Barham's shifting of the scholarly and public landscape of Mahler's socio-cultural reception and remediation through 40 outputs and public engagement activities; Mark's distinguished body of discipline-anchoring analytical work on twentieth-century British music; Wiley's leading of emergent autoethnography and revisory work on biography and Smyth; Volioti's growing influence on empirical performance studies and the cultural understanding of Grieg (*M&L* article on Grieg and Landscape (2017) shortlisted for the Westrup Prize); and the distinguished contribution to word and music studies of McGrath's monograph on Beckett and music.

#### Future strategic aims

DMM's strategic aims are to: **1) continue leading the art-science agenda, building research strengths, plurality, and disciplinary interconnectivity through collaborative and open-access channels; 2) further enhance impact as an exemplar of cross/intra-disciplinary excellence in music, media technologies and engineering.** This includes routes to **3) increasing already healthy research output levels, PGR recruitment, breadth of staffing, conference hosting, research income, external collaborations, and infrastructure** (realisation of advanced plans for new premises in the next 10 years, Covid-permitting), geared to further cementing DMM's world-leading profile in the creative industries.



Cognisant of Surrey's thematic priorities relating to DMM researcher expertise — 'Technology and Society' (Frohlich, Mermikides, Myatt, IoSR), 'Lifelong Health' (Frohlich, Mermikides), 'Cultural Practices' (IGRC, IAGMR, musicology and creative practice staff) — the Head of Department (HoD) spearheads future planning through consultation with the Director of Research (DoR), Research and Innovation Services (RIS) and wider discussion with staff at individual, programme, and Faculty level. Planning takes into account: funding bid culture (enabling, for example, Coleman's Surrey Sound Sphere equipment for sound field rendering and perceptual experiments (£38k) and Coleman/Gilbert's 2020 £97k Research England 'World Class Laboratories' (WCL) High Volume Data Capture and Display upgrade); sabbatical arrangements; buy-out schemes (supporting Barham's forthcoming monograph *Music, Time and the Moving Image*); and Faculty fellowships supporting project development and grant applications (Armstrong and Wiley 'Intimate Partnerships', below).

Research bids totalling c. £6.1M are under review or scheduled for submission in 2021:

- 3G Paper in Healthcare Domains; Digital Glasses for the Ageing Process (EPSRC)
- 16K UHD Real-Time Video Processing; Audio Narrative Space (EPSRC)
- REACT: Reverse Engineering the Art of Cinematic Technique (Leverhulme)
- Technological Mediation of Folk-Music Practices (Leverhulme)
- Intimate Partnerships in the Creative Compositional Process (AHRC)

In DMA the launch of the Centre for Creative Arts and Technologies is a strategic priority, building on collaborations with Dimension Studios, Centroid Pinewood, BFI, Fgment Productions, and NextGen VFX Skills Academy. Typifying DMM's ethos, the Centre combines creativity and technological innovation in the production and understanding of moving-image media: animation, visual effects, games, interactivity, immersion, digital theatre and virtual production.

In music, the IAGMR will see further conferences, seminars, discussion groups, public events, a Routledge book series, funding bids, and PGRs supporting its strategy of leading new thinking in the field. In 2021–22 DMM, through Mark, will host the Fulbright Scholar Justin Vickers during the completion of his project *The Aldeburgh Festival of Music and the Arts: A History of the Britten and Pears Era, 1948–1986*.

DMM staff have robust 5-year research pipelines, including:

- **work in press:** Barham, *Global Film Music in the Early Sound Era* (Routledge); Wiley, *Women's Suffrage in Word, Image, Music and Drama: The Making of a Movement* (Routledge), and *The Routledge Companion to Autoethnography and Self-Reflexivity in Music Studies*
- **contracted monographs:** Poulaki, *Transformative Continuity in Film and Media* (Palgrave Macmillan); Barham, *Mahler and musical meaning* (IUP), *film music and time* (CUP)
- **contracted edited books:** Wiley, *The Oxford Handbook of Musical Biography and Life-Writing*, and *The Cambridge Companion to Ethel Smyth*
- **journal articles nearing submission:** Brookes & Mason, 'Timbral modelling for automated audio tag generation' (*JAES*), Volioti, 'Narrativity in Grieg's Ballade Revisited' (*JRMA*)

- **research bids in final development:** Brookes, SMART-2 (EPSRC), Frohlich, Mediated Musical Collaboration (AHRC), Wiley and Armstrong as described above (AHRC)
- **commissioned compositions, installations:** Goss, *Concerto for guitar and orchestra* (National Endowment for the Arts, USA), Myatt, spatial sound installation and performance: *Seaphony* Alte Münze Berlin, commissioned by Oceans21 for launch of UN 'Decade of Ocean Science' 2021; installations for Shanghai Biennale, Venice Architecture Biennale 2021

Through mechanisms of mentorship, internal funding, and opportunities for dissemination described above, DMM is committed to supporting the research profiles and grant portfolios of its early career researchers (ECRs), and to ensuring high-quality staff progression towards senior research-leader roles.

#### Open access and research integrity

The above demonstrates that Open Access is not just embedded within DMM's current and future strategies, but is a fundamental enabler for research areas in DWRC, music and IoSR. DMM is committed to transparency, open communication and disseminating research findings to other researchers and the public. The Surrey Research Insight (SRI) team supports and advises on open access and research visibility. All outputs are shared through the SRI open-access repository. Researchers submit materials at the point of acceptance, and electronic copy of PGR theses/portfolios are lodged in the SRI repository.

DMM is committed to the highest ethical standards in research. It applies the University's 'Code on Good Research Practice', which endorses the Universities UK Concordat on research integrity through honesty, rigour, transparency, open communication, care and respect. The University Ethics Committee and Research Integrity and Governance Office oversee staff and PGR research projects. Ethical and legal issues of all grant applications are fully considered in Department and Faculty peer review. The DoR advises on research ethics from the early stages of project development.

## **2. People**

#### Staffing strategy and development

DMM's development since 2013 has been shaped by a diversified staff recruitment strategy that reflects — and pioneers thinking and practice in — the contemporary multi-modal world of art-technology-science interfaces.

After significant University-wide restructuring in 2015, DMM staffing was reshaped into its current complement of 19.5 FTE: 4 Professors (one at .5FTE), 1 Reader, 8 Senior Lecturers, and 7 Lecturers, supported by Associate Lecturers, instrumental tutors, and technical staff.

The appointment of 7 new academic staff strengthens the research base in technological and engineering expertise (De Sena, Coleman, Adeyemi-Ejeye), contemporary creative practice (Hall, Weinbren), musicological range (Volioti, Hall, McGrath), and crossover activities between these areas.

Staff work in a supportive and collegiate environment, often in collaborative teaching and research projects. ECRs are allocated a senior colleague as mentor and peer reviewer of research progress, outputs and funding applications. Informal individual or small-group research

support beyond this characterises DMM, for which flexible and carefully considered research management, particularly of ECRs, is a core quality. The latter bore fruit in de Sena's 2020 EPSRC New Investigator Award of £401k for the Scalable Room Acoustic Modelling project, and McGrath's Leverhulme bid 'Technological Mediation of Folk-Music Practices'. De Sena was shortlisted for University Researcher of the Year (2020).

Localised support is matched by Doctoral College programmes in ECR mentoring, career development, supervisor training, research bidding and project management, and by the University's core Research and Innovation strategy of attracting highest-quality ECRs to Surrey (de Sena, Coleman, McGrath), and providing a matching environment to support career development.

DMM's DoR, HoD, and Director of PGR work closely to oversee and facilitate research activity. Research issues are managed in regular Departmental, sub-group, and individual meetings. Through consultations and funding routes, HoD and DoR work to ensure the recognition, support and promotion of ECR and probationer research. The DoR reports from the monthly Faculty Research and Innovation Committee directly to DMM staff on relevant matters of research management, support, and infrastructure. The DoR and HoD report annually to the Dean of the Faculty and Associate Dean for Research and Innovation (ADRI) to evaluate each staff member's research profile, so that successes are recognised and support needs identified.

With a flexible sabbatical scheme (one semester paid research leave each 4/5 years), and careful management of teaching and administrative loads, staff are given time and space to develop funding applications and complete individual or research-group projects. Research success is recognised, and clearly and fairly incentivised, by University processes of appraisal, promotion (Barham to Professor, Mermikides to Reader, Armstrong to Senior Lecturer), awards, performance-related pay schemes (Barham 2014 for international conference organisation), and through showcasing at the Faculty's annual Festival of Research.

DMM staff have benefitted from University, Faculty, and local research and funding support mechanisms (detailed in Section 3 below). The RIS team provides logistical advice on bid financing, and operate a research impact and engagement fund. The Institute of Advanced Studies (IAS) offers grants to support arts and humanities conferences and Fellowships. The Faculty Research Facilitation Officer and ADRI regularly update on bidding opportunities, and manage the internal peer review process. The Faculty offers travel grants, pump-priming awards, and Research Fellowships (FRF) to support large-scale bids through workshops, training, advice, and mentoring. The DMM DoR, HoD, head of DWRC, and senior colleagues provide subject-specific advice on bid preparations.

#### PGR student recruitment and support

DMM has significantly expanded PGR student recruitment since 2013. At any one time 35–40 doctoral students are at work across subject areas. 30 PhDs and one MPhil were awarded in the period, a 36% increase from REF2014, which, together with developments in provision outlined below, achieves 2014's stated aim '**To increase student numbers and consolidate the quality of ... PGR activity**'.



Of 71 PGR students active during the assessment period, 15 were awarded external funding (Techne AHRC Doctoral Training Partnership, EPSRC, Bang & Olufsen, BBC, Marion Redfearn Trust, Wolfson Microelectronics, Agência Nacional de Telecomunicações (Brazil), Microsoft, Govt. of Malaysia), and 17 awarded Faculty/Doctoral College studentships, or the prestigious Vice-Chancellor studentship.

PGR students in DMM are supported by the Doctoral College through its guidance for applicants, its Researcher Development Programme, discussion fora addressing PGR life, and championing of ECRs via participation in the HR Excellence in Research initiative. PGR students are fully supported at Departmental level, first through a 6-monthly review process. Secondly, bespoke research training programmes are combined with fortnightly visiting research seminar series, and the recently launched research-intensive all-day workshop scheme. Music PGR students participate in conferences, symposia, and study days hosted by DMM, and attend research training modules delivered in the Masters programme.

Through this varied diet of provision, PGR students encounter key research methodologies, skills, theories, practices, concepts, and frameworks, and are given regular opportunities to present their research and receive feedback from peers and staff on matters of content, methodology, and presentational strategies.

In IoSR and DWRC, 20 PGR students have been mentored and trained within extended staff-led research groupings. DWRC and IoSR also run tailored research seminar series, the latter a bi-annual programme for audio researchers across the University with invited academics, PostDocs, and industry guests, including most recently Stine Johansen (Aalborg Universitet), Adèle Simon and Søren Bech (B&O), and Jon Francombe (BBC R&D). The IGRC supports the world's largest guitar PGR cohort with 12 current students (from Brazil, USA, Hungary, Germany, Switzerland, Italy, France, Slovenia, Greece, and UK).

DMM PGR students graduating since 2013 have pursued distinguished careers in academia (Universities of Southern Denmark, Brasília, SUNY Potsdam, Denver, Zurich, Huddersfield, Salford, Westminster, Brunel), and the commercial sector (CEO Spitfire Audio, Lead R&D Engineer BBC, Principal Engineer Sandy Brown Associates, Senior Engineer Qualcomm, Senior Principal Engineer HARMAN International). DMM PGR student Arkle won the University PGR Student of the Year award, 2020.

#### Equality, diversity and inclusion

DMM is committed to fulfilling the University's programme ensuring equality, diversity and inclusion in all forms of research activity, from recruitment and collaboration to external engagement and public-facing activities. DMM resolutely embraces EDI principles as enshrined in the Race Equality and Athena SWAN Charters, the Disability Confident employment scheme, the AccessAble support scheme, Stonewall's 'Acceptance without Exception' LGBTQ+ workplace equality index (supported by the University's 'Rainbow Allies' initiative), and the 'Time to Change' campaign against mental health discrimination.

The Doctoral College's Disability and Neurodiversity service supports those with additional learning needs and related conditions, and its mental health first aid training is available for PGRs and ECRs. Unconscious Bias training is mandatory for all staff, with in-person training required for line managers and staff involved in recruitment, disciplinary and promotion procedures.

*Delivering on EDI principles*

In accordance with University and Faculty initiatives, DMM established an EDI forum for all staff and students in 2020. This group formulates positive actions to address systemic EDI issues in HE and industries related to DMM disciplines: student and staff recruitment, support for all members of the DMM community, and outreach targeting communities and affiliated companies (BAME scholarship in sound engineering sponsored by AIR Studios). The Gender Equality lead submitted DMM's 2020 Athena SWAN Bronze application, and heads sub-committees addressing equality issues in appointments, promotions and part-time employment.

DMM supports flexible working for staff with caring responsibilities, implements Keep-In-Touch days for those on parental leave, and phased returns from maternity or medical leave. All line managers are trained to identify staff and student wellbeing issues, and are expertly supported by the University's Centre for Wellbeing.

EDI issues are embedded in research activities:

- Honorary Visiting Professor appointment of composer and Surrey alumna Odaline de la Martinez, long-time champion of female composers.
- Wiley's research explores female composer Ethel Smyth, women's suffrage, autoethnographic studies of ethnic minority artists, and post-colonial diaspora. He has contributed papers to International Women's Day, Annual Women's History Network Conference, and LGBT History Month events, and booklet notes for a DMM-supported recording by Samantha Ege of the piano works of Florence Price.
- Barham collaborates with Surrey Professor of Law Rodriguez-Blanco on the TECHNE-funded 'Conflux' doctoral training programme (2021–22), *Blame and Black Lives Matter: Responsibility for Historical Wrongs, New Perspectives from the Humanities and Arts*, to foster exchange of creative ideas on questions about self, agency, blame, moral worth, truth and history.
- Barham's PGR student Arkle works as HE EDI activist and is Executive Board member of the EDI in Music Studies Network. She has worked at University of Surrey in this capacity on BLM-related fora run by the Faculty and Doctoral College.
- EDI aims are cemented into the tenets of the IAGMR, which has ensured gender balance and diverse ethnic representation in its 21-strong Advisory Board.

DMM paid careful attention to EDI in the formulation of the REF2021 submission. Output selection was conducted in strict accordance with the published code of practice.

Representatives from the University REF2021 team attended all meetings, and all members of the selection committee completed REF2021-specific EDI training. The selection committee took due account of the demographic characteristics of the UoA. The selection process was continually reviewed with EDI issues at the forefront of decision making.

### 3. Income, infrastructure and facilities

#### Research income

In the REF2021 period DMM significantly increased research income levels compared to previous performance. Over £2.3M of research-council and industry funding was awarded.

DMM's research funding strategy is one of ambition, scale, innovation, and impact. Staff are supported in implementing bids of appropriate size and degree of collaborative enterprise that enhance the research landscape within and beyond the Department, Faculty, and University, develop industry relationships, and directly benefit the UG and PG teaching environment.

DMM research has attracted significant Faculty and University support (outlined in Section 2.): Wiley (IAS for 2017 conference 'Writing About Contemporary Artists', and FRF for AHRC 'Intimate Partners' bid), Armstrong (FRF), Barham (Research Impact and Engagement Fund for Jazz conference 2016, Faculty award for overseas archival research); Coleman, Frohlich, Goss, and Hall (pump-priming for equipment, collaborative initiatives, pilot projects).

Building from this internal support, DMM-led external funding from research councils and industry sources totalled £11.8M, with £2.36M allocated to DMM (IoSR £1.6M, DWRC £569,089, Music £192,246) — a step-change increase since REF2014.

The IoSR has been awarded 10 RC and industry research grants (EC H2020, EPSRC, Cirrus Logic, BBC R&D, Bang & Olufsen). Most recently De Sena obtained £401k from EPSRC for the Scalable Room Acoustic Modelling and Evaluation project (2020). DWRC's 13 research projects and international research network have been funded by EPSRC, Digital Economy, Innovate UK, and supported in kind by independent companies.

Compositional and spatial audio art research has been funded by AHRC (network grant), SSHRC (Canada), and commissioning bodies or technology companies, including:

- Arts Council England
- Canada Council for the Arts
- Hong Kong Academy for Performing Arts
- Scottish Chamber Orchestra
- Britten-Pears Foundation
- BBC/TBI
- Ableton
- Tate Modern
- Wellcome Foundation
- MoMA, New York
- Oceans21 (Berlin)
- Art Basel (Miami)

Musicological research has been supported by scholarly bodies such as the IMR, RMA, *M&L*, HEA, Film Music Foundation (California), British Association of Victorian Studies, Feminist and Women's Studies Association, for conferences, keynote speakers, editorial/translation work, publication costs, archive materials, and research visits.

#### Infrastructure and facilities

The DoR manages an annual £20k research support budget to assist staff in achieving research goals. Fully allocated each year, it enables conference and archive travel, research meetings, consultations, purchasing software/licences/hardware, proofreading, image reproduction, visiting research collaborators, transcription/digitisation. This budget works alongside University and Faculty-level support mechanisms, Faculty research support funds, research impact budgets, and fellowship programmes, as described above.

*Sound recording*

The IoSR benefits from professional facilities of the highest standards, which provide the essential environment for all of SR's experimental, creative, and industry-related research projects. These include three recording studios, three edit rooms, three bespoke listening environments, over 100 microphones, a Neutrik Cortex MK2 binaural head, and a wide range of digital and acoustic test and measurement equipment and software.

Studio 1 floor is 250 square meters and designed to be acoustically similar to a chamber concert hall. Its control room was upgraded in 2017 with a 32-fader Studer Vista 1 digital mixing console, and the studio itself refurbished in 2018 (£250k) to enhance the acoustic performance of the space in order to support a greater range of use. This studio allows very high quality multi-microphone capture of spatial audio, as well as pseudo-anechoic acoustic measurement using the impulse response truncation method.

Studio 2 floor is 60 square meters and has a drier acoustic allowing for greater sound source separation. Its control room centres on a 56-channel SSL 9000K series console. This facility is ideal for pop/rock music and speech recording. Studio 3, a mixing/post-production/sound-to-picture studio, allowing mixing of spatial audio content to exacting standards, was completely refitted (£230k) in autumn 2013, with an acoustic redesign by John Flynn and Sam Toyoshima of Acoustics Design Group and an AMS-Neve 88D digital mixing console.

The microphone collection contains rare examples, including 3 of the c. 2000 original AKG C12 valve microphones, classic ribbon microphones such as ST&C 4038s, flexible and often-used microphones such as AKG C414s, and high quality currently available microphones such as DPA 4011s and Schoeps CMC6Us.

The critical listening room allows tightly controlled playback for the listening-based experiments essential to IoSR research in psychoacoustic engineering, and supports experimentation, the production of spatial audio artworks, and critical listening. It is built to the ITU-R BS.1116 standard and in 2016 was fitted with a new 22.2-channel playback system, utilising Genelec 8330A SAM studio monitors and 7350A SAM subwoofers providing built-in time, level and frequency response alignment. Stereo B&W 801 loudspeakers are also available.

The 'Surrey Sound Sphere', provides a reconfigurable 3D array of up to 64 Genelec 8020 loudspeakers to aid research into next-generation spatial and object-based audio systems. The 'Domestic Listening Lab' provides an environment visually and acoustically similar to a typical living room allowing the running of externally valid perceptual tests and user trials in a realistic home environment. This research has recently been enhanced by Coleman/Gilbert's £97k Research England WCL award for High Volume Data Capture and Display facilities.

On the recent S3A project, a key initial step was determining the most important perceived differences between alternative methods of capturing and reproducing spatial sound. Live performances in Studio 1 were captured using eleven simultaneous multi-microphone arrays plus a binaural head. These recordings were then mixed and listener-evaluated using seven different reproduction systems configured in the Surrey Sound Sphere.

The findings led directly to the development of technology to enhance listener envelopment in a domestic space using ad-hoc devices such as smart-speakers and phones. Listening tests

conducted in the Domestic Listening Lab steered the prototyping, evaluation and refinement of this technology. An important element of the technology was the novel sound diffusion algorithm which was perfected using controlled experiments in the Critical Listening Room.

#### *Digital World Research Centre*

DWRC funding since 2013 has supported the employment of 15 staff. In 2016 the Centre moved to larger and more flexible facilities within CVSSP, comprising Head of Centre office, group meeting rooms, equipment storage, large open-plan RA and PhD student workspace, multimedia recording and editing facilities, and a home living laboratory for new media experiments.

The relocation established strategic links between the centres, leading to the two largest joint research awards of this period (EPSRC 'Making Sense of Sounds' £1.59M, and 'Next Generation Paper' £1.17M) — among Surrey's most significant examples of co-located interdisciplinary working across two faculties combining social sciences and digital media with engineering/physical sciences.

#### *Digital media arts*

DMA virtual-/augmented-reality research including the 2020 '(Re)animating Stanislavski' virtual theatre project, and the 2017 'Transience of Memory' interactive film residency at the Griffith Film School, Australia, are enabled by investment in state-of-the-art equipment:

- TV Studio with green-screen facility
- Microsoft HoloLens v1
- HTC Vive VR
- Oculus Rift VR
- Insta360 Pro 8K 360° camera
- Perception Neuron 32 sensor motion capture kit
- Alienware laptops + 'Graphics Accelerator' eGPU with Nvidia GTX Titan, to support VR applications
- Organic Motion OpenStage 2 markerless motion capture system
- 3x GH5 cameras with 12-60mm M34 lenses and 2x 128GB SD cards

#### *Music*

Music shares the purpose-built and recently refurbished (2018–19) Performing Arts Technology Studios building with SR, which in addition to the studios and edit rooms described above, contains rehearsal spaces of varying sizes, 6 further edit suites with computers and monitoring for audio post-production, composition and musical notation, the Moog Synth Lab, instrumental resources, meeting rooms, staff office space, and technical stores.

Practice-based research involving performance and composition workshops, meetings, experiments and presentations are facilitated by the 250-seat Studio 1, 70- and 40-seat music-equipped spaces in the adjacent Teaching Block, edit suites, Synth Lab, and large rehearsal spaces. Studio 1 was equipped with a new Steinway D piano in 2019, and the existing Steinway D refurbished to support two-piano repertoire. The studios support instrumental recording and the production and development of composition and sound-art projects.

A collaboration between DMM, Moog Music Inc. (US) and the Moog Sound Lab UK enabled the development of a synthesis room supporting musical composition and experimentation. The facility features a rare, reconstructed Moog System 55 modular synthesiser, all production Moog



synthesisers, Moogerfooger effects units, original prototypes of the Moog Guitar, and other modular synthesisers used in experimental creative practice research (Myatt, Mermikides, Hall).

Music staff office spaces are equipped with piano and IT resources. DMM's annual capital expenditure and equipment budgets enable staff to access software, hardware, library and other essential research resources. Software licences for compositional work, (Sibelius, Max/MSP, Logic and Pro-Tools) are available to practice-based research staff, along with the SR facilities, studios and equipment listed above.

Central library resources and infrastructure received significant institutional investment since 2013, expanding online provision in areas pertinent to DMM: BibliU Bookshelf, Kortext, Kanopy, journal subscriptions, and databases of audio recordings, critical texts, and citation indices (RILM, Performing Arts Periodicals Database, Journal Archives).

#### 4. Collaboration and contribution to the research base, economy and society

DMM's contribution to the international research base distinctively combines:

- **industry-focused engineering projects drawing on scientific experimentation and commercial collaborations** (contribution to **economy**, and to Surrey's status as one of only two UK universities described as a top 55 Tech Challenger by *Times Higher Education*)
- **social-welfare-, environment-, and medically-orientated applications and developments of (sound, music, and image) digital technology or spatial audio** (contribution to **society**)
- **culturally and creatively impactful musical (and audiovisual) composition, performance, and musicological enquiry** (contribution to **cultural economy** and **society**)

DMM's research crosses traditional boundaries between (sub)disciplines (digital technologies–sociology, music–image/literature/philosophy), and between the arts and sciences themselves (creative musical practice–audio engineering, aesthetics–spatial audio). This **collaborative** plurality and **multi-disciplinarity**, engendered without detriment to the intradisciplinary integrity which DMM continues to pursue rigorously, lends an unusually productive and adaptable perspective to its research ethos.

##### *Sound recording*

Research in SR and spatial audio is inherently **collaborative** and **interdisciplinary**, as demonstrated in the flagship EPSRC-funded project 'S3A: Future Spatial Audio for an Immersive Listener Experience at Home' (2013–19), combining **expertise in 3D audio and visual processing at Surrey (Brookes, Mason, and Coleman), Southampton, Salford, the BBC and UK industry (Audio Software Development Ltd and KEF Audio)** to enable a sense of live events through delivery of immersive 3D sound to the home.

Similarly, the Horizon-2020-funded project 'Audio Commons: an Ecosystem for Creative Reuse of Audio Content' (2016–19) was managed by Brookes and Mason **in collaboration with** Surrey CVSSP and Business School, QMUL, and Universitat Pompeu Fabra (MTG), to promote use of open audio content and develop technologies supporting the Audio Commons Ecosystem of content repositories, production tools and users.

The virtual (Re)Sounding of Place (vRSP) project (AHRC, with follow-on, and EPSRC) saw **Myatt**, EMMY-winning film/TV composer and Visiting Professor **Michael Price**, and digital and interactive media expert **Kirk Woolford**, **collaborating** with The Control Room Ltd. and Dimension Studios on novel spatial audio methods in immersive environments, integrating 360° video, mapped environment capture, performance, sound, and volumetric multi-dimensional (holographic) video.

With postdoc Research Fellows, colleagues in other Surrey Departments, and external co-investigators, SR staff have **jointly contributed** over 150 outputs to leading journals: **JAES** ('Evaluation of Spatial Audio Reproduction Methods', 2017), **IEEE/ACM Transactions on Audio, Speech and Language Processing** ('Room Impulse Response Interpolation Using a Sparse Spatio-temporal Representation of the Sound Field', 2017), and **Journal of The Acoustical Society of America** ('Personal Audio with a Planar Bright Zone', 2014).

**De Sena** is **strategic collaborator with KU Leuven (Belgium) on the Spatial Dynamics of Room Acoustics (SONORA) project** (ERC Consolidator Grant), undertaking acoustic modelling work with applications in hearing technology, virtual reality, human-machine interaction, musicology, and acoustic monitoring.

Leading international agendas in spatial sound art over the last two decades, **Myatt** integrates production and reproduction into international artistic, conservationist, curatorial, and municipal **collaborations with experimental artists such as Chris Watson (UK)** (*Cemetery* with Watson and filmmaker **Carlos Casas** won multiple awards at the Marseille International Film Festival, and is streamed on the MUBI film channel), **Jana Winderen (No)** and **Yasunao Tone (US/Jp)** (MOMA NY, Art Basel Miami, Tate Modern, EMPAC US, and Oceans21 for UN 'Decade of the Oceans' — see ICS 'New Directions in Spatial Audio Art').

SR research has been granted patents for technology developed in the 'Perceptually Optimised Sound Zones' collaborative project (IoSR, CVSSP and Bang & Olufsen, 2010–14):

- 2016: System for optimizing the perceived sound quality in virtual sound zones (US9277322B2), [patents.google.com/patent/US9277322B2/en](https://patents.google.com/patent/US9277322B2/en)
- 2017: System and a method of providing sound to two sound zones (US20150264507A1), [patents.google.com/patent/US20150264507A1/en](https://patents.google.com/patent/US20150264507A1/en)

Algorithms, systems, and technologies have been adopted by external bodies:

- 'Audio Commons' timbral prediction algorithms incorporated into the application programming interface (API) for the [freesound.org](https://freesound.org) audio database
- 'S3A' Media Device Orchestration (MDO) system used by the BBC
- De Sena/KCL's SDN and PSR technologies coded as a VST plugin used by musicians, composers, studios, and theatres (Guildhall Art Gallery, Christie's NY, RADA, V&A Museum, Reeps One, Playlines, Kimatica, Gestalt)

#### *Digital World Research Centre*

DWRC designs new media innovation projects for health and wider socio-cultural benefit. 33 publications were internationally co-authored by **Frohlich** in the period, notably five papers from

the UK-Brazil **collaborative network** on 'Assistive Media' — for example, 'Mobile digital storytelling in a Brazilian care home', *HCI International* 2018. The network **continues collaborating on new research projects, bids, and papers, all enabled by open-access inter-institutional data sharing.**

With 13 completed projects, and 4 ongoing, the DWRC's **collaborative partners** are numerous and diverse: **creative artists** Armstrong, Simon Desbruslais, Ligeti Quartet ('Com-Note', 2013); **HE institutions** Swansea University ('Light tags', 2014), SETSquared universities consortium ('ICure', 2014), Communication University of China in Beijing ('Immersive audiophotography', 2016), UFSCAR, Brazil ('Mobile technology for older people', 2016, 'Augmented paper in dementia care', 2018), USP, Brazil ('Media parcels', 2017, 'Time matters', 2018); and **external organisations/companies** Digital Economy 'Communities and Culture' Network, London Borough of Lambeth, Farrells Architect Planners ('Storytelling for development', 2015), RPptv Intelligent Media ('Eyes free: my ears onto here – sonic augmented reality', 2018).

DWRC has designed new technology prototypes involving open source software and/or intellectual property. Invention disclosures have been filed on the Next Generation Paper project, a GB patent filed, and commercial and open-source applications launched from this, Com-Note, and Frohlich's mobile digital storytelling app.

### Music

- a) Composition, Performance and Sound Art: acoustic, electronic or computer-based

Research contribution in this area prioritises **socio-cultural enrichment** through engagement with audiences, national and international networks of artistic partners, and exploratory technological and creative ideas.

**Goss's** extensive compositional output with supporting texts and media has changed the landscape of creative and public understanding of the guitar as solo and ensemble instrument, through mining and recasting its rich vein of cultural, historical, and expressive reference points. Esteem, contribution, and relationship with international cultural custodians, beneficiaries, and audiences (as represented in the submitted portfolios built around the 5 Concertos, 6 chamber-music works, and 19 pieces for guitar (solo, group, or with voices) composed during the assessment period) can be gauged by his status as **Honorary FRAM** (granted to only 300 living RAM graduates); **over 80 CDs** of compositions; **performances** by Russian National Orchestra, China National Symphony Orchestra, Royal Liverpool Philharmonic Orchestra, State Symphony Orchestra 'New Russia', RTÉ National Symphony Orchestra, Barcelona Symphony Orchestra; **articles and interviews** with BBC, *Tonebase*, RAM, *Soundboard*, *Classical Guitar*, *Gramophone*; book chapter in *Music and Sonic Art: Theories and Practices*, and 3 PhD/DMA theses on his music (US, Australia, Portugal); **composer residencies**: Universities of Melbourne, Newcastle (NSW), Bogota, São Paulo, Columbus State, Georgia, Nat. Cons. Peru, HK Academy for Performing Arts, RCS, Orpheus Sinfonia. **Commissions and creative partnerships** include: John Williams and RPO, Colombian National SO, BBC NO of Wales, Scottish CO, Koblenz International Guitar Festival and Academy, The Worshipful Company of Musicians, Guitar Foundation of America, 2020 Changsha International Guitar Competition, Sir Andrew Lloyd Webber, Nicola Benedetti, Sheku Kenneh-Mason, Xuefei Yang, and Ian Bostridge.

**Armstrong** structures creative output around themes of **collaboration**, revision, and borrowing, co-leading the AHRC-funded (£30k) **Music Composition as Interdisciplinary Practice** project

through three symposia (York, Oxford Brookes, and Surrey), and four commissioned works involving theatrical montage and found sources, digital entities and avatars (Squib-box/Hatsune Miku), choreographic response to music, and site-specific collaboration with humanities researchers. Armstrong enriches the DMM research environment through interaction with artists (Judith Weir, Graham Fitkin, Cheryl Frances-Hoad, Jocelyn Pook, Zubin Kanga from IRCAM, David Gorton (RAM), Stevie Wishart, Michael Zev Gordon) in hosted events: Compositional Sketches Study Day, Roundtable on Composers' Careers (both 2015), compositional revision colloquium (2020), and numerous research seminars.

Supported by c. £83k funding, **Mermikides** has carved new interdisciplinary spaces in integrating technology into creative practice, **collaborating** artistically with individuals and institutions in scientific disciplines (Morten Kringelbach, Music in the Brain Research Centre, Denmark; Ableton, Peak Brain training software), and artists (Laura van der Heijden, Peter Zinovieff, Alison Jackson (BAFTA-winning photographer), Adam Ockelford (Director of the Applied Music Research Centre), Mandy Parnell (Grammy-winning engineer for Björk, Aphex Twin, Sigur Ros)), in exploring medical, cognitive, and neuroscientific resonances across media:

- rhythmic expression beyond conventional notation: articles in *Jazz Perspectives*, *Soundboard Scholar*, *Guitar Techniques Magazine*; original software tools; internationally delivered workshop *Breaking 4/4*
- sonification of scientific data: keynotes for Royal Physiological Society, British Sleep Society, Royal Society of Medicine, British Psychological Society, Frank Mohr Institute; talks for TEDx, BBC Radio 4, Design Museum; exhibitions in 20 different countries
- electroacoustic composition blending psychological research and wide stylistic integration through M-Space techniques: published on Deutsche Grammophon, Extreme, Mute, Viribus, and performed internationally.

#### b) Musicology

Research in musicology ranges from **collaborative** edited collections, book series, themed journal issues, research groups, international conferences and meetings, to single-authored books, journal articles, book chapters, and conference papers, complemented by diverse routes to media and public dissemination. Methodologies ranging from the analytical and empirical to the critical and cultural are deployed to deepen understanding of the structure, meaning, performance and reception of music from the 18th century to the present.

In over 40 outputs during the assessment period, **Barham** combines scholarly work on Mahler, screen music, and jazz with public outreach (BBC Radio 3, Proms Plus, Southbank, LPO, OAE, Philharmonia, BBC Scottish SO, CD notes for BIS Records). A leading authority on Mahler, he rethinks the music's cultural significance and meaning, relation to philosophy, literature, other arts, political and social identity, and media appropriation, as evidenced in submitted outputs and public engagement.

Working '**To strengthen, build and nurture links with regional, national and international partners**', **Barham** has developed the **collaborative** momentum of international conferences (early film music, and Davis/Coltrane) into 3 edited books and a book series since 2013: rethinking Mahler's relationship to earlier musical legacies, exploring music in experimental film, and (in press) charting early global film music (50-author Routledge Companion building from

BA- and DAAD-funded archival research, promising to reshape the screen music studies landscape). Barham's *Oxford Studies in Recorded Jazz* series (6 volumes since 2013) similarly builds on **collaborative networks**, to rebalance jazz scholarship and public understanding towards fuller musical consideration of jazz performance. The IAGMR is a highlight of recent **collaborative enterprise** underpinned by a critical mass of research expertise within DMM and forging UK and international affiliations (Austrian Cultural Forum, German Historical Institute, Gesellschaft für Musikforschung, Institut für Musikwissenschaft, Vienna, Gustav Mahler Research Centre, Innsbruck). In 2020 a 21-strong international Advisory Board was appointed, a book series submitted to Routledge, and an inaugural symposium (2020) and larger conference (for 2021) organised.

**Mark's** long-standing contribution to the musicology research base, primarily on Britten and Bridge (see submitted outputs), draws on various analytical methodologies to enhance listeners' experience and critical understanding. As founder of *twentieth-century music* and the Biennial International Conference on Music Since 1900 prior to the assessment period, and convenor of the latter's tenth iteration at Surrey in 2017, he continues to shape the environment of contemporary music research.

**Wiley** combines groundbreaking work in the emergent musical autoethnography field with renewed perspectives on biography ('Myth-Making and the Politics of Nationality', 'Biography and Life-Writing'), and Ethel Smyth and feminism, disseminated through a themed journal issue (*JMR* 2019 on biography), book chapters, an edited interdisciplinary book (Palgrave Macmillan, 2020) on writing about contemporary creative artists, 6 international symposia on these themes, and public engagement (talks, programme and CD notes, reviews for Glyndebourne, RPO, BBCSO, Proms).

**Volioti** (ECR) conducts Grieg research (journal articles 'Reminiscing Grieg', and 'Landscaping the Gaze' reconsidering early recordings and visual art forms in 19th-century contexts) alongside empirical performance studies traversing the art-science divide. She convened the first Surrey performance studies conference ('New Takes on Recorded Music: Performance, Creativity, Technology', 2019), was keynote speaker at 'The London International Piano Symposium', RAM 2018, and curated the public exhibition 'The Player-Piano and Pianola', Surrey 2015.

ECR **McGrath's** monograph *Beckett, Repetition and Musical Modernism* (Routledge 2018) contributes substantively to intermedial word and music studies, offering new perspectives on issues of semantic fluidity in modernist literary and musical artworks across stylistic and cultural boundaries — a pluralistic approach also brought to his IGRC work and consultancy for AHRC-funded **collaborative** research in guitar pedagogy at Goldsmiths.

#### Further esteem indicators

DMM staff are in demand as consultants to their respective disciplines:

- **speaking invitations** (keynotes, conferences, seminars, public events in Europe, North and South America, Asia): Barham, Mark, Volioti, Goss, Mermikides, Wiley, Armstrong, Brookes, De Sena, Coleman, Poulaki, Weinbren, Frohlich
- **writing invitations** (OUP, CUP, Routledge, MIT Press, Lang, *NCMR*, *CMR*): Barham, Mark, Volioti, Myatt



- **reviewing funding applications** (AHRC, EPSRC, Leverhulme, BA, Austrian Academy of Sciences, NWO, ETAg, Israel Science Foundation, DAAD, Austrian Science Fund): Barham, Wiley, Goss, Brookes, Frohlich, Poulaki
- **reviewing book and journal publications** (OUP, CUP, Routledge, Boydell & Brewer, *IEEE journals*, *Applied Sciences Journal*, *JAES*, *JASA*, *NECSUS*, *Empedocles*, *Comunicazioni Sociali*, *Kinephanos*, *M&L*, *JRMA*, *JAMS*, *Music Analysis*, *NCMR*, *Twentieth-Century Music*, *Music Sound and the Moving Image*, *Popular Music*, *The German Quarterly*, *German Studies Review*, *Musicologica Austriaca*, *Arts Journal*, *Women & Music*, *Studies in Educational Evaluation*): Barham, Mark, Wiley, Coleman, Brookes, Adeyemi-Ejeye, De Sena, Poulaki
- **consultancy** (RSI, Mahler 2020 Festival Amsterdam, Mahler Foundation, BBCTV, Omnibus Press, Hull University, RHUL, Exeter, Goldsmiths, Liverpool Hope, Tate Modern, Humble Bee Films, T-B A21 Foundation): Barham, Wiley, Goss, McGrath, Myatt, Brookes
- **PhD examining and co-supervising** (Oxford, Cambridge, Huddersfield, Birmingham City, Sheffield, Salford, Imperial, QMUL, RHUL, Univ. Cape Town, Stellenbosch Univ., SA, KU Leuven, RCM, RCS, RAM, GSMD, Royal Irish Conservatoire, University of Ulster, TU Dublin): Barham, Wiley, Goss, Brookes, De Sena
- **external examining** (OU, York, Cardiff, Leeds, City, Sussex, RHUL, RCS): Barham, Wiley, Goss, Mermikides, Brookes
- **visiting professorships/research associateships** (KCL, Liszt Academy Budapest, RAM, Universities of Melbourne and São Carlos, Brazil): Barham, Goss, De Sena, Frohlich
- **editorial board, committee membership, editorships** (numerous international conference committees, IEEE, VQEG, FP7 Initial Training Network on Audio Quality, MAES, ISM, Gustav Mahler Research Centre (Innsbruck), *Sonic Scope* (MIT), *NCMR*, Neuroaesthetics and Neurocultures research group, SCMS, NECS, SCSMI, ISSN, LISFE Short Film festival jury, *Organised Sound* (CUP), *JMR*): Barham, Wiley, Brookes, Myatt, Poulaki

The breadth and international profile of these activities allow staff to serve as exemplars of best practice for supporting PGR and ECR career development, and for shaping environments at the leading edge of (inter)disciplinary research.