Institution: Birkbeck College
Unit of Assessment: Psychology, Psychiatry, & Neuroscience
a. Overview

In RAE2008, Birkbeck's Department of Psychological Sciences was ranked among the top five Psychology departments in the UK. Since then, we have further enhanced our reputation as a world-leading research institution in cognitive and developmental neuroscience, cognitive modelling, and family and health psychology. This was achieved by targeted new appointments, major infrastructure investments, and by implementing our strategic aims for research. Our research excellence during the assessment period is reflected by our published work (over 1200 publications, over 44 per FTE staff member), our ability to attract large-scale external grant funding (with new grants awarded since 2008 totalling £18.5m and research spend 82% up at £2.11M pa vs. £1.16M pa in RAE2008), a vibrant doctoral training program (92% more 4yr full time PhDs awarded at 7.4 pa vs. 3.9 pa in RAE2008), and many prestigious awards for both senior and early-career staff (including fellowships of the British Academy and the German National Academy of Science, three Royal Society-Wolfson Research Merit Awards, and four APS Rising Star Awards).

Our research is structured around four thematic research clusters that represent our core areas of research excellence, each with a focal research centre and associated labs. The boundaries between them are dynamic and fluid, with several staff members linked to more than one cluster. This structure fosters coherence within research teams, and facilitates collaboration between clusters and with other institutions. The four research clusters are:

- **Brain and Cognitive Development**. This cluster is organised around the **Centre for Brain and Cognitive Development** (**CBCD**), which was established at Birkbeck in 1998, and is a world-leading centre for developmental cognitive neuroscience. Research is conducted in the Babylab and associated labs. With targeted appointments, a new genetics group has been established within the CBCD.
- **Cognitive Modelling.** Research in this cluster builds on our continuing excellence in computational modelling, which has been strengthened by a targeted senior-level appointment. This group is organised around the newly established **Centre for Cognitive and Computational Modelling**.
- **Perception, Attention, and Emotion**. Research in this cluster is focused on cognitive and affective neuroscience and sensorimotor control. It has been strengthened by major infrastructure investments and the appointment of four new early-career staff.
- **Child, Family, & Health Psychology**. This cluster employs quantitative and qualitative methods to examine health and development in individuals and families. It includes the **Institute for the Study of Children, Families, and Social Issues** and the Interpretative Phenomenological Analysis research group.

Cutting across these four clusters, the **Birkbeck/UCL Centre for Neuroimaging (BUCNI)** houses our research fMRI scanner.

b. Research Strategy

Our goal since 2008 has been to further enhance our profile as one of the leading research-intensive Psychology departments in the UK. Our research strategy for the current assessment period is based on these key principles:

- Build on the department's strengths in emerging areas of research that are both cutting-edge, and unique in the UK context
- Improve our research areas of international excellence through targeted appointments of new staff with outstanding track records and research agendas
- Provide all researchers with optimal infrastructure, including purpose-built labs, specialist equipment, dedicated research support staff and financial and technical support
- Provide academic leadership and interdisciplinary collaboration and support within and across research clusters, including dedicated mentoring and support mechanisms for the research career development

- Maximise value of our key location in close proximity to outstanding neighbouring institutions in health, cognitive neuroscience, and education
- Implement an internationally competitive doctoral training programme, with a major focus on translational research and industrial partnerships
- Encourage and support research-led impact initiatives

Our research strategy and innovation are reviewed monthly at the department's **Strategic Planning Group**, which liaises closely with the **Research Committee**. These groups prioritize horizon scanning to identify future and emerging areas of research that dovetail with the existing skills and profile of the department. They make strategic decisions on the composition and future trajectory of research clusters and on targeted infrastructure investments and new appointments.

To implement our research strategy, we have made significant **changes to our staff and research infrastructure** since 2008. Most importantly, the department has substantially increased in size. There were eight new appointments of category A staff, all but one at an early-career level. One staff member included in RAE2008 (Usher) has left. All new staff were targeted recruitments whose research both builds on and complements existing core areas of excellence. In line with the strategic goals described in our RAE2008 submission, we have established a new Genetics research group and a new Centre for Cognitive and Computational Modelling, and have further developed our internationally leading profile in developmental and cognitive neuroscience.

We have made major new investments in research infrastructure (section d) to provide the best research facilities for newly recruited staff, to upgrade research space for other staff, and to integrate the majority of our researchers and labs under one roof in Birkbeck's main building in Malet Street. A new purpose-built research facility (**Mace Experimental Research Laboratory in Neuroscience; MERLiN**) was completed in the basement of the main building in 2011. This new facility includes 11 labs for behavioural and neuroscientific research, wet lab facilities for genetics research, and dedicated office space for postgraduate and postdoctoral researchers. In addition, an entire wing of the main building has been re-developed to provide new staff offices and additional testing rooms. The **Institute for the Study of Children, Families and Social Issues**, (previously located off-campus) has moved into a newly developed suite in the same building. Co-locating the majority of staff labs under one roof greatly facilitates communication and research links within and between research clusters. These new research facilities complement our major infrastructure investments prior to 2008, which include the purpose-built Henry Wellcome building with its world-leading infant and adult neuroscience research labs (completed in 2006) and the neuroimaging facilities at BUCNI (completed in 2007). Our current infrastructure provides state-of-the-art specialist facilities that meet the research requirements of all staff members.

Plans are in place to further develop and expand our research infrastructure over the next five years. (1) The **Centre for Brain and Cognitive Development (CBCD)** is expanding, and now requires additional new purpose-built research space and facilities for new staff. Substantial funds have been raised toward a new £3.7 million extension building for the CBCD to develop a new Toddler Lab facility. This lab will utilise the latest wireless and virtual environment technology to allow, for the first time, the study of brain functions during home, play and pre-school environments in toddlers. (2) We will further extend our capacity for brain imaging research at **BUCNI**. As planned, **BUCNI** has developed into a world leading fMRI facility. We plan to supplant the current research-dedicated Siemens 1.5T Avanto with a state-of-the-art 3T system, funded by shared infrastructure investments by Birkbeck and UCL, with additional contributions from charitable donors who have already been identified. (3) We will further expand the **MERLiN** labs in Birkbeck's basement**,** including an extension of the wet lab facilities for our new genetics group, and the installation of further eye tracking, electrophysiology, and TMS labs.

Research Clusters

Brain & Cognitive Development **(Csibra, Dick, Dumontheil, Johnson, Karmiloff-Smith, Kirkham, Mareschal, Meaburn, Ronald, Senju, Thomas, Southgate).** This cluster, centred on **CBCD**, studies the neural basis of typical and atypical perceptual, cognitive and language development from infancy to adulthood. It has been strengthened by new appointments (**Dumontheil, Meaburn**), and by two senior research fellows who lead their own teams on career development fellowships: **Southgate** (Wellcome Trust) and **Senju** (MRC). CBCD has hosted a further fifteen post-doctoral research fellows since 2008 (funded by ESRC, EC, NSERC, Fyssen

Foundation, Simons Foundation, Leverhulme, Wellcome). It is a major centre for PhD research training, the lead hub for several EU and international networks, and regularly hosts sabbatical visits from world-leading researchers. The work of the group is characterised by its theory-driven research programme that uses converging methods (behavioural testing, eyetracking, ERP, EEG, EMG, motion capture and kinematic analyses, optical imaging, computer modelling, behavioural genetics, functional and structural MRI). CBCD is organised into labs which share common infrastructure. The BabyLab (**Johnson**, **Csibra**, **Mareschal**, **Kirkham**, **Southgate** and **Senju**) focuses on typical, at-risk, and atypical brain and cognitive development over the first years. The Developmental Neurocognition Lab (**Thomas**, **Karmiloff-Smith**) investigates variability and individual differences in typical development and developmental disorders. Our new Genetics Group (**Ronald**, **Meaburn**) employs genetic, epigenetic and transcriptomic methods. Learning and developmental fMRI studies at **BUCNI** are led by **Dick** and **Dumontheil.**

The CBCD has an outstanding reputation for interdisciplinary research, often conducted within the context of national and international initiatives**.** This includes large-scale multi-disciplinary studies of infants at-risk for later autism or other atypical outcomes. **Johnson** is the PI and Chair of a national network funded by a consortium of UK charities (British Autism Study of Infant Siblings) and leads a key component of the largest ever academic-industry collaboration for autism research (European Autism Intervention) which now extends to several NIH-funded sites in North America. Other examples of major interdisciplinary work include research on Down syndrome and Alzheimer's Disease (**Karmiloff-Smith**, funded by the Wellcome Trust), and the **Centre for Educational Neuroscience** (Director: **Thomas**), a joint initiative of Birkbeck, UCL and the Institute of Education, where psychologists, neuroscientists, and education experts develop multidisciplinary methods for improving learning.

Cognitive Modelling **(Cooper, Davelaar, Hahn, Mareschal, Oaksford, TJ Smith, Thomas)**. This cluster (based around the newly opened Centre for Cognitive and Computational Modelling) builds on the unique strength of the department in cognitive modelling, with work on probabilistic Bayesian models, rule-based architectures, connectionism, and neurodynamical modelling. The Centre is led by a recent senior-level appointment (**Hahn**) and also includes a newly recruited early-career staff member (**TJ Smith**). During the assessment period, modelling approaches have been successfully applied many cognitive and neural phenomena, including the control of sequential action (**Cooper**), conflict monitoring (**Davelaar**), the perception of randomness and optimism bias (**Hahn**), analogy and the development of complex cognitive skills (**Mareschal**), reasoning and argumentation (**Oaksford**), gene-environment interactions and autism (**Thomas**), and eye movement control during scene viewing (**TJ Smith**).

During the current assessment period, every single member of the cognitive modelling group has published at least one article in the most prominent journals in this field (*Psychological Review, PNAS,* and *Behavioral and Brain Sciences),* with a total of fourteen papers in these three journals alone across the whole group since 2008. Another notable achievement was the award of an inaugural British Academy medal (**Cooper**, for *The Organisation of Mind, 2011, OUP,* published together with Shallice*)*. The Centre for Cognitive and Computational Modelling held its inaugural event in March 2013, attended by researchers from many UK institutions, and plans more international events and a Summer School.

Perception, Attention, and Emotion (**Derakhshan, Eimer, Longo, Müller, Press, Richards, Sereno, Shepherd, M Smith, TJ Smith).** This cluster focuses on visual cognition, sensorimotor control, and affective processing, with multiple complementary methods, including behavioural testing and psychophysics, electrophysiology, functional brain imaging, TMS, and eye tracking. State-of-the-art specialist facilities are available in the Henry Wellcome building and the new **MERLiN** labs**.** Since 2008, this group has been strengthened by appointments of four early-career researchers **(Longo, Press, M Smith, T J Smith**) who contribute complementary research agendas (real-world scene perception, body representation, imitation) and methodological skills (neuroimaging, computational tool development, eye tracking, modelling).

This group includes the research teams of two world-leading experts in cognitive electrophysiology (**Eimer**) and functional brain imaging (**Sereno**), both of whom have held Royal-Society Wolfson Research Merit Awards during the REF period. At the junior level, **Longo** has received prestigious early career awards from the EPS and APA, and was recently awarded a

large-scale ERC Starting Grant. Methodological innovation is a major focus of this group. This includes the development of methods for the combination of EEG and eye tracking data (**TJ Smith** and **Eimer**), and fMRI/EEG co-registration, using a recently installed fMRI-compatible EEG amplifier system at BUCNI (**Sereno, Eimer** and **Press**). In addition to basic research, the group's work is notable for its clinical, social, and cultural relevance, such as **Shepherd's** research into migraine and headaches, **Eimer's** investigations into the causes and consequences of developmental prosopagnosia, and **TJ Smith's** contributions to cognitive film theory and to art restoration (see impact case studies).

***Child, Family, & Health Psychology (*Barnes, Belsky, Eatough, Melhuish, Miles, JA Smith)**. This cluster researches the health, wellbeing and development of individuals and families using a range of quantitative and qualitative methodologies. It has been strengthened by the recruitment of **Miles**. The Institute for the Study of Children, Families, and Social Issues (**Barnes**, **Belsky**, **Melhuish)** conducts major evaluations of programmes and policy initiatives that address national and international priorities in education, social-cognitive development, child and family health, and parenting support aimed at providing evidence to inform social policy. Examples include the evaluation of early childhood interventions, the National Evaluation of Sure Start, evaluation of the Family Nurse Partnership programme and longitudinal studies on early childcare and education and their relevance for later development. The impact of this work on practice and government policy is described in REF3A and in two of our impact case studies.

The interpretative phenomenological analysis (IPA) research group (**JA Smith, Eatough**) conducts research in family and health psychology, often in collaboration with quantitative researchers in other institutions, on topics such as family understanding and decision making in clinical genetics, adherence to HIV treatment, and family attitudes towards posthumous brain donation. Smith's work has led to IPA becoming one of the world's foremost qualitative approaches in psychology. **Miles** employs qualitative and quantitative methods to examine cancer screening and treatment, and the public understanding of cancer.

Collaboration and integration within and across research clusters: We place strong emphasis on coherence and communication not only within research clusters, but across the entire department. This is ensured by regular seminars, specialist reading and discussion groups, and training workshops for staff and postgraduate students. The CBCD organises a weekly seminar series, frequent social events, regular afternoon tea, and a variety of short courses, some under the European Marie Curie "Centre of Excellence" training grant. The Modelling and Perception groups hold a weekly lunchtime seminar series with national and international speakers. MERLiN runs a weekly Journal Club and regular external seminars. The genetics group holds a fortnightly genetics journal club, and organizes regular training events and scientific meetings with other genetics researchers in Bloomsbury. The department publishes its own newsletter each term, which highlights awards and prizes, successful grant applications, major publications and media coverage of research.

c. People, including: i. Staffing strategy and staff development

The department has grown substantially since 2008. Over the REF period, we have made 8 new academic appointments (**Hahn**, at the professorial level; **Dumontheil, Longo, Meaburn**, **Miles, Press, M Smith,** and **TJ Smith** at the lecturer level). These appointments were targeted to fit with our research strategy (section b) and complement our existing areas of research excellence. All new staff met our stringent criteria for outstanding track records, and have innovative research agendas and methodological expertise. In addition, we continue to nurture career research fellows, and in the REF period two postdoctoral fellows have gone on to obtain prestigious independent long-term fellowships that have allowed them to develop their own research teams (**Southgate, Senju)**. To accommodate this expansion in staff, new purpose-built office space and research facilities have been provided. Our strategy for research-related staff support and development has four key elements: We provide top-class research facilities and other research support, offer multiple structures for career development and mentoring, prioritize research over other academic roles, and support and incentivize external research funding.

(a) To ensure that newly recruited staff member and all other staff have access to **state-of-the art research infrastructure**, new laboratories for behavioural testing, electrophysiology, eye tracking, and genetics research have been built during the assessment period (section d). Further infrastructure support is provided by our research support, technical and IT staff (section d). All new staff receive substantial start-up funds to set up their own experimental labs. Internal research funding is available from the School of Science and the Psychology department. The School's research fund provides up to £5K per project (approximately four annual awards to Psychology). The departmental Research Committee has an annual budget of £7K for research projects. All members of staff receive £1000 per year for research-related expenses. The School of Science also operates a paid participant panel (approx. £17K per year), which is essential in a College with part-time students and evening classes, where an unpaid participant panel based on course credit is not feasible.

(b) Mechanisms are in place to facilitate **career and research development** of individual staff members, and in particular early-career staff. All staff members have an annual Professional Development Review (PDR) meeting with the HoD, where career progress is discussed, resource and training requirements are identified, and milestones for the attainment of specific research and career goals (e.g., external grant funding, publications, academic promotion) are agreed. In addition to the PDR, all early-career researchers are assigned a Mentor in a cognate research area. Mentors are senior staff members who arrange regular one-to-one mentoring meetings (at least one per term), where research-related strategies and goals are discussed and agreed, and problems and obstacles for successful career development are identified. Whenever possible, the mentor acts in coordination with the HoD to resolve any problems. In addition, we have implemented an Early Career Group where all new members of staff meet on a monthly basis with a senior staff member (**Eimer**). This group provides an informal forum for the discussion of research-related issues and problems that are specifically relevant for early career staff (e.g., setting up and managing research groups, supervision of PhD students, publication strategies, balancing teaching and research). The group also functions as a workshop for honing grant writing skills. In addition to these mentoring structures, all early career staff are fully integrated into existing research clusters, centres and labs, where senior academics provide leadership, and additional peer support is available.

(c) In line with our status as one of the UK's leading research-intensive psychology departments, **academic roles and commitments are balanced in favour of research-related activities**. Teaching loads are equally distributed among all members of staff, with reduced loads for new appointees. Our advanced student teaching is research-driven, with final year research projects and options as well as our MSc courses directly reflecting active areas of research. We have introduced a postgraduate demonstrator system for time-intensive courses such as practical research methods classes. This minimises the day-to-day demands of these courses on staff, and frees up time for research. Administrative duties are light and widely distributed, to engage all staff in college and departmental activities. A workload model is used to monitor the allocation of teaching and administration. A research sabbatical system is in place (one term for every seven served), with all staff members equally entitled to sabbatical leave.

(d) Mechanisms are in place to incentivise and **support the acquisition of external grant funding**. Internal research funds (described above) are preferentially allocated as "seed funding" to projects aimed at obtaining pilot data for grant applications. The discussion of external funding sources and the procedures involved in obtaining funding are a central part of all PDR and mentoring meetings, and of the Early Career Group. We have installed a grant support network (coordinated by the department Research Committee), where experienced senior staff provide advice and support in all practical aspects of grant writing by early-career researchers. To reward successful applications, a proportion of the grant overheads is directly allocated to the award holder, and is freely available to fund research-related expenses. The successful acquisition of external grant funding is also incentivized through the College's promotion and contribution-related pay award procedures.

The department's staffing policies and support arrangements fulfil all key principles of the **Concordat to Support the Career Development of Researchers**. Recruitment and selection are

guided by the College's official recruitment and selection policy. Selection of new staff is based on excellence in our one of our core research areas, and the selection process involves all existing staff members. Once recruited, we place a high premium on retention by proactively proposing excellent staff members for promotion and/or contribution-related pay awards. Birkbeck is committed to maintaining its status as a world class research institution, and is therefore responsive to requests for resources to retain outstanding research staff. The College also has procedures in place to move fixed term researchers onto open ended contracts and/or to redeploy them (Principles 1 and 2). Our research strategy commits us to providing staff with all resources, lab facilities, and training opportunities required to conduct their research successfully (Principle 3). The mentoring system for early-career staff and the annual PDRs for all staff focus explicitly on career development and on the resource and training needs of individual staff members in order to promote and sustain the research potential of staff at all career stages. The College operates a study assistance scheme, which offers a fee remission of up to 95% plus 10 days study leave per annum. Postdoctoral researchers have taken courses in complementary disciplines such as computer science to enhance their research skills. Research students and support staff also take advantage of this scheme on a regular basis (Principles 4 and 5). Diversity and equality of treatment (Principle 6) is a key feature of all procedures in the department and College. We are a diverse department in terms of nationality, with a positive gender mix: 53% of FTE staff are women. Birkbeck is a Bronze award holder for the Athena SWAN Charter for Women in Science, and a member of the Positive for Disability 'Two Ticks' scheme. All staff with responsibility for recruitment receive diversity and equality training to ensure that all relevant principles are upheld. At the College level, the HR department and the Research Committee review these procedures, and monitor the department's commitment to good practice (Principle 7).

c. II. Research students

Our **PhD programme** has substantially expanded since 2008, with an increase of 92% on 4yr full time awards per year over the RAE2008 period. There were 43 completions during the assessment period, and 26 new external studentships were awarded to the department. These were complemented by 3 studentships from a joint scheme with other central London Colleges, and 6 part-funded studentships. In 2010, the department was awarded ESRC Doctoral Training Centre status, together with other Bloomsbury colleges (Institute of Education, School of Oriental and African Studies, London School of Hygiene & Tropical Medicine). Birkbeck hosts the Psychology Cluster, and now receives up to 5 studentships per year for experimental psychology, developmental science, educational neuroscience, health psychology, and computational modelling. In addition, the department has introduced a new Graduate Teaching Assistant programme during the assessment period, which allows students to complete a PhD over four years while contributing to the teaching in the department (and enhancing transferable skills). There are currently seven fully internally funded PhD positions in this programme.

Major effort and resources have been put into developing the highest quality **research training**. We have restructured and expanded our programmes for postgraduate research students in response to changes in student demand, staff expertise, and advances in research. Since 2008, the department has introduced a suite of new taught Masters courses, reflecting its core areas of research excellence, and two MRes programmes facilitating the transition to high-level research. A structured PhD training programme is provided for all doctoral students in line with HEFCE supervision guidelines. This programme includes training in neuroscientific, quantitative, and qualitative methods used in our research, as well as generic skills training (including impact-related topics such as interacting with the media, collaborating with non-academic beneficiaries, and conducting translational research), specialist seminars, and funds for complementary skills training (e.g., MatLab, EEG/ERP, neural network modelling, brain imaging). The department provides the funding for research student travel to international and national conferences, for participants in PhD student research, and for specialist research training costs. Several members of the department were invited to provide advanced research methods training courses for postgraduate students abroad (in Saudi Arabia, Taiwan, the USA, and several European countries).

The international quality of the department's research training was recognized when the **CBCD** was selected in 2010 as a Marie Curie Training Centre of Excellence by the European Commission for a second time (it achieved this status for the first time in 2004). This prestigious

award provides seven fully funded postgraduate fellowships, and identifies the top 5% research training centres in Europe across all life sciences. Very few departments obtain this training centre status more than once. A unique feature of this training programme is the extensive participation of private sector partners from the technology, manufacturing and services industry (e.g., Proctor & Gamble, Acuity and EGI). These collaborations bridge the gap between basic developmental neuroscience research and private sector applications. For example, all PhD students in this programme receive in-house training at Proctor & Gamble's global research centre in Germany on how to translate basic science into marketable products. The department's focus on strategic links with industry to advance translational research training is also illustrated by the recent award of an MRC CASE studentship.

The quality and international impact of our doctoral training programme is further demonstrated by **international prizes** (Glushko Dissertation Prize; Cognitive Science Society, USA; European Cognitive Science Society Best Student Paper; First Prize in Student Software Competition, 17th European Conference of Eye Movements; two Society for Reproductive and Infant Psychology postgraduate prizes; Prins Bernhard Cultuurfonds Beurs Prize, NL) and **postdoctoral fellowships** (British Academy fellow; Marie Curie returning fellow; CERES Fellow, Hungary; Winkler Fellow St Hughes College, Oxford University) awarded to doctoral students during the REF period. Former PhD student have obtained numerous **faculty positions** since 2008 (University of Western Australia, University of Essex, Midddlesex University, University of Westminster, University of Malta, University of Warsaw) or **research positions** (Oxford University; Cambridge University; University College London; King's College London; Institute of Education; City University; Goldsmith's College; University of Rochester, USA)

d. Income, infrastructure and facilities

The department has maintained its excellent track record in obtaining **external grant funding** since 2008. The National Evaluation of Sure Start (a major source of departmental income prior to 2008) has been completed during the current assessment period, but this has been compensated by the acquisition of numerous new large-scale awards. Since 2008, the department has earned new grants totalling £18.5M, and it currently houses 32.3 FTE grant-supported postdocs and research assistants. Total research expenditure (excluding Sure Start) has increased by 82% (£2.11M pa as compared to £1.16M pa in RAE2008). Funders include the European Commission, MRC, ESRC, BBSRC, EPSRC, Wellcome Trust, Royal Society, British Academy, Leverhulme Trust, Nuffield Foundation, Waterloo Foundation, Simons Foundation, Autistica, National Institute of Health, the Department for Children, Schools, and Families, and the Department of Health. Spend on all major sources of external grants has increased over the assessment period compared to RAE2008: BIS Research Councils: 44% (from £626K pa to £899K pa); UK charities: 119% (from £192K pa to £420K pa); EU: 156% (from £78K pa to £200K pa). UK central government funding (excluding Sure Start): 404% (from £59K pa to £295K pa).

Building on large-scale infrastructure investments prior to 2008 (see section b), we have further extended our **research facilities** during the current assessment period. To co-locate the majority of staff and research facilities under the same roof, major investments have been made to provide new lab and office space in Birkbeck's main building. A whole wing of this building (covering a floor area of 300 m^2) has been re-developed to provide academic office space for our newly appointed staff members, and to create six new experimental test rooms. The Institute for the Study of Children, Family, and Social Issues has been relocated from Bedford Square to a newly developed suite in the main Birkbeck building (173 m^2). Our previous research space in Senate House has been vacated during the current REF period, and has been replaced by new purpose-built and substantially upgraded lab and office facilities in the basement of Birkbeck's main building. This new lab suite (**MERLiN**) with a total area of 214 m^2 includes 6 acoustic booths for electrophysiological, optical and psychophysiological research and 5 sound-attenuated booths for eye-tracking and behavioural research, as well as office space for 33 postgraduate and postdoctoral researchers. Equipment and equipment upgrades for these new labs include a 64 channel EEG system, an EyeLink eye tracker, a Magstim TMS system, a BIOPAC system upgrade, new fEMG modules, state-of-the-art equipment for auditory and tactile stimulation, and a device for measuring macular pigment density. To support the work of our new genetics group, a new genetics wet lab was established as an extension to **MERLiN** in 2013, which enables on-site

bio-banking of samples, molecular genetic experimentation and postgraduate training in cutting-edge molecular genetic techniques. These genetics facilities are run in collaboration with the inter-institutional Bloomsbury Centre for Genetic Epidemiology and Statistics. This development also provided 3 further behavioral testing booths (total additional area 54 m^2).

In addition to the newly developed research infrastructure in Birkbeck's main building, other research facilities are located nearby. State-of-the-art facilities for EEG/ERP testing of adults, children, and infants, eye tracking, optical imaging, EMG, Kinematics and motion capture, TMS, and patient testing are available in the Henry Wellcome building, which was opened in 2006, and is shared by the CBCD and Eimer's cognitive electrophysiology research group. Further CBCD office space and research labs are located at 32 Torrington Square. The Siemens TIM Avanto 1.5T MRI scanner at **BUCNI** is located in the ground floor of 26 Bedford Way. This facility is shared with UCL, and provides users with both product and custom pulse sequences for echo-planar, diffusion weighted, and structural (T1/T2) imaging. BUCNI has expanded its research infrastructure since 2008 using external grants, inter-institutional initiatives, and recharge fees. It obtained one of the first 32-channel head coils in the UK, along with multiple specialized surface coils. BUCNI invests considerable time in building and maintaining state-of-the-art visual projection, eye-tracking, and auditory systems, and a unique high-resolution MRI-compatible tactile stimulation system developed and manufactured in-house by **Sereno**. Inter-institutional collaboration between **Sereno**, **Eimer** and colleagues at UCL has resulted in state-of-the-art EEG/fMRI and TMS/fMRI setups. BUCNI has also obtained a real-time head motion capture system allowing for online magnetic gradient adjustment. This joint project with the Wellcome Centre for Neuroimaging and Great Ormond Street Hospital) promises a major advance in ultra-high-resolution structural scanning as well as functional and structural imaging of movement-prone populations (toddlers, patients with attention or movement disorders). A new mock scanner is currently being equipped with eye tracking and other response modalities. Finally, **Dick** and **Sereno** have made a considerable investment in building the BUCNI community, which now includes over 60 PIs. In the last REF period, BUCNI has safety trained over 300 certified users, 70 scanner operators, and 10 operator trainers. All active users and operators undergo yearly refresher training.

A key part of the department's research infrastructure is its **professional research support**. For example, the department co-funds a senior research support leader at the CBCD (Tucker) with over 20 years of research support experience, who leads a team of 16 research assistants and 3 administrative staff. Similarly, our technical and computing support team is led by an experienced senior specialist (Reisman) in charge of IT support. In total, the department funds 5 technical and IT staff, a 0.5 FTE administrator and a 0.5 FTE MRI physicist at BUCNI, and also has an Assistant School Manager focusing on research with a team of two administrators.

All research within the department falls under the BPS codes of conduct, including the **BPS Code of Human Research Ethics** and the **BPS Guidelines for the Conduct of Psychological Research within the NHS.** Research governance is an individual and a collective responsibility. Training is regularly provided to make all research staff aware of these codes. These are monitored by the **Departmental Research Ethics Committee**. All research proposals must be submitted to this committee, which can refer specialist proposals to internal or external experts. The departmental ethics committee reports to the **College Ethics Committee**, which oversees its operations and provides a further level of scrutiny. Patient-based research with NHS partners is submitted to the relevant NHS local or multi-centre research ethics committees, and must conform to the appropriate NHS guidelines. EC funded projects go through full EC ethical review. The BUCNI ethics committee reviews all BUCNI-related MRI projects with healthy adults, with developmental or clinical populations reviewed by the appropriate UCL Bioethics or NHS bodies. The departmental ethics committee reviews all research given ethical approval from NHS partners and other boards/institutions, and records are maintained. A five-yearly internal audit of research governance and ethics procedures is carried out, and procedures are regularly reviewed and updated by the research ethics committee, to ensure best practice.

e. Collaboration and contribution to the discipline or research base

The excellence of our contributions to psychological science, our focus on interdisciplinary and collaborative work, and our strong emphasis on impact-related research has been widely acknowledged at the national and international level. Since 2008, both senior and early-career

members of the department have received many national and international awards for research excellence. Awards include: **four APS Rising Star awards** (Massand, Ronald, Senju, Southgate), **three Royal Society Wolfson Research Merit Awards** (Eimer, Mareschal, Sereno), **two EPS Mid-Career Awards** (Johnson 2010; Eimer 2013); **two Academicians of the Academy of Social Sciences** (JA Smith 2009; Melhuish 2012); **two Fellowships of the APS** (Mareschal 2013; Oaksford 2012); **EPS Bartlett Lectureship** (Karmiloff-Smith 2012); **BPS Lifetime Achievement Award** (Karmiloff-Smith 2009); **Fellowship of the British Academy** (Johnson, 2011); **Fellowship of the German National Academy of Science - Leopoldina** (Eimer 2013); **Philip Leverhulme Prize** (TJ Smith 2013); **Fondation Mattei Dogan International Prize in Psychological Science** (Karmiloff-Smith 2012); **Doctorat Honoris Causa, University of Amsterdam** (Karmiloff-Smith 2010); **Jean Nicod Prize** (Csibra, 2011); **BPS President's Award** (Johnson 2008); **BPS Spearman Medal** (Ronald, 2012); **EPS Prize Lectureship** (Longo 2013); **APA Distinguished Scientific Award for Early Career Contributions to Psychology** (Longo 2013); **Inaugural British Academy Medal** (Cooper 2013); **BPS Neil O'Connor Award** (Senju 2011); **BPS Margaret Donaldson Award** (Southgate 2011), **Wilhelm Wundt Prize** (Müller 2010); **Visiting Professor, Kaohsiung University, Taiwan** (Richards 2009); **Kerstin Hesselgren Research Professorship,** Swedish Research Council (Hahn 2013); **Visiting Research Professor, St. John's College, Oxford** (Derakhshan 2012); **L'Oreal-UNESCO Women in Science Award** (Jones 2013).

The department is a major hub for national and international research networks and collaborations. Using the strategic advantage of our multi-national faculty and our central London location, we have further strengthened these links since 2008. In London, we are full partners in inter-institution facilities such as **BUCNI**, the Centre for Educational Neuroscience, and the Bloomsbury Centre for Genetic Epidemiology and Statistics. Nationally, we are the co-ordinating hub for large-scale research networks such as the British Autism Study of Infant Siblings, and the national evaluation of the Effective Pre-school, Primary, and Secondary Education programme. Our excellent track record in European collaboration is demonstrated by the **CBCD** uniquely securing a prestigious **EU Marie Curie Research Training Award** for the second time in 2010. CBCD is also a key partner in the large-scale EU-Aims project "European Autism Interventions", and participates in four other EU-wide research networks.

Members of the department have served as editors or on the editorial boards of many leading international journals, including ***Psychological Review*** (Mareschal, Oaksford), ***Developmental Science*** (Mareschal, Johnson), ***Neuropsychologia*** (Eimer), ***Cognition and Emotion*** (Derakhshan, Richards), ***Anxiety, Stress and Coping*** (Derakhshan, Richards), ***Cognitive Science*** (Cooper), ***Emotion*** (Richards), and ***Child and Adolescent Mental Health*** (Barnes). Members of the department have organised many international conferences at Birkbeck and elsewhere, including the 29th International Conference of the Stress and Anxiety Research Society 2008 (Derakhshan), the 12th Neural Computation and Psychology Workshop 2010 (Davelaar), the 7th International Conference on Thinking 2012 (Oaksford), and the 34th Annual Conference of the Cognitive Science Society 2012 (Cooper).

Our strong focus on **interdisciplinary research and collaboration** reflects our long-term strategy to develop specific areas of interdisciplinary research excellence in fields where we are internationally leading. Two of our core research areas, developmental cognitive neuroscience and computational modelling, were identified as world leading in the UK by the RCUK/AHPD/EPS/BPS Benchmarking Review of Psychology**.** Another important aspect of our emphasis on collaborative and interdisciplinary research is our strong involvement in translational, applied and impact-related initiatives. Our Institute for the Study of Children, Families, and Social Issues conducts evidence-based evaluations of early intervention and educational programmes that have a direct impact on government policy (as described in two of our impact case studies). Other examples of research-led impact, and of our structures to facilitate and support research impact, are described in REF3A. The policies and structures put in place since 2008, and our focus on recruiting and nurturing the very best young faculty, will ensure that the department will continually assess, improve, and sharpen its research profile and impact in the long-term. We are optimistic that our reputation for international quality research will continue to grow.