

<b>Institution: University of Surrey</b>
<b>Unit of Assessment: 16 - Economics and Econometrics</b>
<p><b><u>1. Unit context and structure, research and impact strategy</u></b></p> <p><b>1.1 Organisation and structure of the Unit</b></p> <p>The School of Economics (the “Unit”) is one of the top economics departments in the UK and is proud of its excellence in both research and research-led teaching and of its collegial and productive environment. It features an outstanding group of staff, who have been trained worldwide and who regularly publish in the best journals. Since the last REF, it has made substantial progress towards the goals of maintaining a steady flow of top publications, producing impactful research supported by a growing portfolio of funding, and offering PhD training in line with top UK institutions; the School is now home to a thriving community of PGR students who contribute to its vibrant research culture.</p> <p>Research, although often originating at individual level, is organised around a research centre and three groups, each designed to capture a core area of the discipline and provide balanced critical mass for research, grant bidding, impact generation, and PhD training. The areas covered are:</p> <ul style="list-style-type: none"> <li>• Macroeconomics (through the Centre for International Macroeconomic Studies, CIMS)</li> <li>• Applied Microeconomics</li> <li>• Econometrics</li> <li>• Economic Theory</li> </ul> <p>Many researchers belong to more than one group or centre and this flexible structure gives each group enough organisational autonomy, while encouraging collaboration between academics in the School. Indeed, in a couple of recent successful bids, staff from Econometrics and Applied Micro have joined forces to work on different aspects of international trade models. All groups organise their own seminar and workshop programmes. This is in addition to the weekly external seminar series, which in recent years had the participation of world-renowned academics such as Richard Blundell (UCL), Vincent Crawford (Oxford), Wouter den Haan (LSE), Ivan Fernandez-Val (Boston), Itzhak Gilboa (HEC-Paris), Johannes Hörner (Yale), Steve Machin (LSE), and Morten Ravn (UCL).</p> <p>CIMS conducts research in theoretical and computational dynamic macroeconomics, as well as on applied topics in the field. Research in the Group has covered topics such as fiscal policy and debt management (Joo, JEEA; Nunes, QJE; Oikonomou, REStud and EJ; Pascoa, JET), monetary policy (Cantore, JEEA; Lazopoulos and Gabriel, JBF; Holden and Levine, JMCB; Nunes, EJ), labour markets (Cantore, JEEA; Oikonomou, REStud), behavioural macro (Levine, JEBO); heterogeneous agents models (Jensen, JPE, REStud), recourse loans (Pascoa, ET), and long run comovements in equity markets (Gabriel, JBF). The Centre has attracted grants from the ESRC and European Commission and has a large international network of collaborators in central banks and universities. It has regularly provided training courses on Dynamic Stochastic General Equilibrium (DSGE) modelling since 2010.</p> <p>The Applied Microeconomics Group covers a variety of areas including education and labour economics (Blanden and McNally, EJ; Koppensteiner, JOLE; McNally, AEJ:EP, JEEA, EJ, JPubE; Parey, REStat), development (Avitabile, JDE; Jaimovich, JEEA; Koppensteiner, JDE, JHR), trade (Breinlich, AEJ:EP, JEEA, JIE), health (Moscelli, JHE; Parey, JEEA), crime/law and economics (Rickman, EJ; Witt, JEEA), and consumer behaviour (Blow, REStud, JPubE; Parey, ReStat). The Group attracts research funding from several sources including ESRC, Leverhulme and the</p>

Nuffield Foundation, and has links with Government bodies in the UK and overseas, as well as other public policy stakeholders.

The Econometrics Group works on a diverse set of areas, including theoretical and applied work on the econometrics of game theoretic models (Srisuma, RAND, QE, IER, JBES), financial econometrics (Corradi, JASA, JoE), macroeconometrics (Corradi, JAE; Santos Silva, JBES), microeconometrics (Corradi, JoE; Santos Silva, JoE), spatial and network econometrics (Martellosio, 2xJoE), and time-series analysis (Corradi, JoE). Members of the Group regularly collaborate with colleagues from different fields, at Surrey and elsewhere, and are currently involved in two projects on empirical international trade funded by substantial ESRC grants.

Work in Economic Theory is both theoretical and applied and covers a wide range of topics at the frontier of microeconomic theory. Theoretical work includes very fundamental research on the general properties of large games (Carmona, JET 2014), social choice and dynamic mechanisms (Gershkov, JET, Management Science, Theoretical Economics and REStud), and general results on the existence of equilibrium (Carmona, JET 2018). Work with important applications covers topics such as welfare implications of shifting to cashless economies (Carmona, ET), the spread of misinformation (Tabasso, GEB), and collective decision making in multi-issue elections (Bozbay, GEB).

## 1.2 Research objectives, impact and strategy

The School's research objectives and strategy have remained remarkably consistent since 2014. This is despite leadership changes at all levels (Santos Silva was hired as Head of School in 2015, and there have been changes in both the Executive Dean of the Faculty and Vice Chancellor during the REF period). The School's objectives at the time of REF2014 were:

1. Sustainable growth via a supportive, balanced and coherent research environment.
2. International excellence in strategically identified core areas that build on existing strengths, provide balance and promote contributions to the discipline and wider social questions.
3. Critical mass necessary to develop new PhD training in line with discipline best practice.
4. Significant engagement with multidisciplinary initiatives across our Faculty and the University.

In 2017 the School (in partnership with the Faculty and University) reviewed its strategy through the development of its five-year plan up to 2022, stating as its vision "The School of Economics is committed to, within the next five years, consolidating its position as one of the leading economics departments in the country, being internationally recognised for its world-class research and for the excellence of its research-led teaching at all levels." This new strategy builds on the strategy presented in the REF2014, and thereby enabled the School to develop further and make substantial progress on the four objectives listed above.

In pursuit of objective 1, the School made 20 appointments during this REF cycle, and therefore re-energised and expanded its research capability. As a result, the number of permanent staff with teaching and research contracts increased by more than 10% (3 FTEs). In addition, at the time of the previous REF the School did not have any academics on permanent teaching-only contracts. The School now has 7 colleagues with this type of contract, who make a crucial contribution to the School's environment by greatly increasing our capacity for teaching and research.

Growth is also dependent on retention and progression, where progression is a key indicator of a productive research environment and therefore feeds back into hiring; over this REF period 13 colleagues have achieved promotion (see Section 2). Naturally, during this REF cycle there were staff changes, but moves have mainly been out of academia or due to changes in family circumstances.

To ensure objective 2, the School's continued expansion has focused exclusively on excellent hires in our core areas (see Section 2) and has achieved the goal of rebalancing our research groups to ensure that the School has the means to regularly attract sizeable research grants and produce research with impact. As discussed in detail below, our research capability was also greatly reinforced by our new PhD programme that brought to the School about 30 excellent and very active doctoral students, who have transformed the School's research environment.

As noted above, our commitment to addressing "wider social questions" has been delivered, in part, by hiring colleagues with research agendas that deliver impact, and who have strong networks outside academia.

Breinlich, Koppensteiner, Moscelli and Parey have been key strategic hires in Applied Micro. For example, Koppensteiner is a member of the UK Government's What Works Trial Advice Panel and works closely with the Brazilian state of Minas Gerais on the reduction of youth crime and on the effects and prevention of dengue fever. Breinlich was a member of the Department of International Trade's Strategic Trade Advisory Group between April 2019 and April 2020 and is PI on a recently awarded ESRC grant with Corradi and Santos Silva that also involves researchers at the World Bank. In addition, colleagues who were already working closely with policy makers have continued with, and in some cases expanded, this commitment. For example, since 2015 McNally has been running the Government-funded Centre for Vocational Education Research while on a part-time secondment at LSE, and this work is reflected in her Impact Case Study.

In Macro, the appointment of Nunes, who has visiting research positions at the Boston Fed and the Bank of England, filled the gap at senior level in Macro that was noted in the previous REF, and is one factor driving our strengthening links with central banks (which are reflected in the Impact Case Study). These links also include the appointment of Karantounias (from the Atlanta Fed), who was hired during this REF cycle but started in December 2020, Gabriel's position as a visitor at the Bank of Portugal, and the fractional positions held by Cantore and Holden, long-serving staff members who now also have positions at the Bank of England and Bundesbank, respectively. Nunes was also part of the Council of Economic Advisors to the Chancellor of the Exchequer, Phillip Hammond, from February 2018 to July 2019 and advised on key budget decisions.

More generally, we have also sought to raise the profile of impact within the School, with one colleague working as Impact Champion to support impact activities. Also, as the Co-Director of the ESRC Impact Acceleration Account awarded to the University from 2019-2023, Blanden supports colleagues across the social sciences in their impact work. This effort to raise the profile of impact has led to the establishment of longstanding partnerships with a range of policy makers and other stakeholders, as described elsewhere and evidenced by the impact case studies.

At REF2014, we had committed to objective 3 and had started to develop a new PhD programme following the recommendations of the ESRC Benchmarking Review. This programme is now in its fifth year, and has been supported by extensive scholarships, with £1.4 million made available internally through School and Faculty funding. A further 5 students have been supported by ESRC scholarships. The 28 talented students who have joined the programme between 2015/6 and 2019/20 have made an enormous contribution to the research culture of the School; they extend and challenge the research agendas of the staff they interact with, they are enthusiastic participants at seminars, and present their own work regularly. Their recruitment and contribution will be discussed in Section 2.

Our approach to achieving objective 4 has changed since the last REF. In the previous REF period, the School's multidisciplinary research was primarily led through two research centres: Surrey Health Economics Centre (SHEC) and Surrey Energy Economics Centre (SEEC). SHEC in particular was responsible for a large share of the research income received by the School. As explained below, our approach to multidisciplinary research has shifted in the last three years. SHEC, which focuses on Health Services Research, has been transferred to the Faculty of Health

and Medical Science; a more natural home. Health Economics, however, continues to be a focus for the School and a key topic for developing multidisciplinary collaboration.

Rickman has long-standing interests in Health Economics, with the focus in this area being strengthened when Blanden took over the large multidisciplinary “Better for Less” grant which explored public sector productivity primarily in the NHS context (see further details below). This area of work has expanded further since Moscelli joined the School. Currently, Blanden and Moscelli are developing research on the medical workforce; Blanden has recently completed work with Surrey Business School on the Gender Pay Gaps in Medicine Review, funded by the Department of Health and Social Care. Moscelli and Blanden have received a £550k grant from The Health Foundation to study NHS workforce retention, and the two are members of the University’s Lifelong Health research theme. This network will be used to engender further collaborations.

The recent strategic hires of Breinlich, Koppensteiner and Parey are also important for developing multidisciplinary projects within and outside the University. Breinlich and Parey are affiliated with AI@surrey, which is an interdisciplinary collaboration in artificial intelligence and machine learning across the University of Surrey. Koppensteiner contributes to the Health theme through his work on the prevention and impact of dengue fever. Koppensteiner and Blanden are currently developing proposals to work on Early Years Education in Brazil which will include the input of education researchers and psychologists, and Koppensteiner is working with epidemiologists on dengue fever prevention.

The research environment within the School is enhanced by strong links to other UoAs. Chitnis, whose outputs are submitted to UoA 12, has maintained the School of Economics tradition of research in Energy Economics and has been very active in multidisciplinary work related to the University’s Sustainability research theme. Her expertise in energy demand has led to her participation in two large multidisciplinary research grants. The Centre for Research into Energy Demand Solutions (CREDS) is funded by UKRI and includes 23 academic and industry partners from different disciplines. It has a vision to make the UK a leader in understanding the changes in energy demand needed for the transition to a secure and affordable, low carbon energy system. “Using Living Labs to roll out Sustainable Strategies for Energy Poor Individuals” (STEP-IN) is a H2020 funded project involving 13 academic and non-academic partners from different disciplines and energy sectors across Europe. The STEP-IN project develops an innovative global methodology for the effective analysis and tackling of energy poverty, i.e. how enhanced energy efficiency can improve quality of life and overall comfort levels. Chitnis is also involved in several smaller projects with a view to expanding her collaborations within and outside the University.

Finally, as described below, Levine and Holden worked with Surrey’s Department of Sociology on a project investigating the connection between DSGE Models and Agent Based Modelling.

### **1.3 School and University research support structures**

At School level, the Head of School, Director of Research and Impact Champion have responsibility for defining strategic aims and ensuring they are met. These are monitored and reviewed by the School Research Committee, of which all research active staff are members. The School Research Committee meets twice per year. The Faculty Research and Innovation Committee, led by the Associate Dean (Research & Innovation), meets monthly and acts as an intermediary between the School and the University Executive. The Faculty Research and Innovation Committee receives regular updates on schools’ and departments’ progress and performance against targets; as well as forwarding direction and support from the University Research and Innovation Committee, led by the Pro-Vice-Chancellor for Research and Innovation.

This structure has served the School well on many occasions, for example by providing information about funding opportunities and other initiatives that are relevant to the School. Recently, the support of the Faculty Research and Innovation Committee also played a crucial role in the appointment of two Vice-Chancellor’s Fellows; Economics was one of the first Schools in the

University to be able to appoint VC Fellows, and one of very few Schools to have more than one Fellow (see Section 2). The Faculty is also supporting the generation of new and innovative research projects and corresponding research funding applications via a Research Fellowship scheme, and Koppensteiner and Parey have been successful in the most recent call.

#### 1.4 Research plans

Each group has plans for development that are aligned with the School's strategic priorities.

CIMS (macro group): Further research plans are being pursued in several areas such as fiscal policy, optimal debt management, finance, macroeconometrics, behavioural macro, informational frictions, monetary policy, and more recently on the construction of epidemiological-macroeconomic models for the study of pandemics. Several new projects bridge different areas, including the intersection of macro with applied micro, econometrics, and theory; new bids in these areas are being prepared. CIMS will continue to deliver and update its courses in the Easter and Summer schools. These courses will support the research activity of the School and foster research networks. The Centre will also seek additional collaborations with central banks, and treasury departments, for instance developing the collaboration with the Bank of Portugal.

Applied Microeconomics: Will develop further research collaborations within the Group as well as with external researchers in economics and other disciplines; several promising collaborations in Education, Health, Labour Markets, and Crime are already in progress. Benefiting from the new large-scale data storage and processing facilities (see Section 3), much of this work will make use of administrative data and Big Data more generally. Research bidding activity will be substantially expanded; this will initially be supported by Parey and Koppensteiner's Faculty-funded Research Fellowships and will gather momentum as internal collaborations continue to develop.

The Econometrics Group is working with the Applied Micro and with CIMS in several projects and plans to continue the collaboration with researchers from other groups (internal and external) on a range of projects, including bids for grants. In parallel, the Group has an active research agenda focused on theoretical and methodological areas such as models for spatial and network data, machine learning, quantile and modal regression, and identification in macroeconomic models.

The research of the Theory Group will focus on projects with high potential impact, including the study of bubbles, capital taxation, voting rules, spread of rumours and diseases, cash and cashless trading rules, adoption of new technologies, large games, dynamic mechanisms, and organisation of knowledge. This research aims at obtaining theoretical breakthroughs as well as influencing real-world policies. The latter aspect will likely foster collaborations with more applied academics and with non-academic institutions and lead to successful grant proposals.

#### 1.5 Open research culture and ethics

In line with the University's [Open Research Position Statement](#), the School is committed to transparency, reproducibility, open communication, and making research findings widely available to all. Researchers in the School aim for the highest standards of research ethics and openness. This is a requirement for publishing in the top journals where refereeing is rigorous, and code must be deposited as a matter of course, as well as data whenever permissions allow. The Surrey Research Insight (SRI) team supports and advises on open access and enhancing research visibility, and is trialling an online [Open Research module](#) that provides the main principles of open research and the tools to apply it in practice. Data and publications are shared through the SRI open access repository. Researchers deposit all outputs at the point of acceptance, and this is a formal objective in the appraisal process. The School has its own Discussion Paper series, and researchers also often publish their work in the working paper series of other institutions such as CEP, IZA, IFS, and CEPR. Upon completion, all PGRs deposit an electronic copy of their thesis in the SRI repository. The School is in close collaboration with the Library, and experts from the Library have presented to the School on issues related to open access.



Formal processes ensure research is of the highest ethical standard. The University Ethics Committee has a diverse, interdisciplinary membership including lay representation. It works closely with the Faculty Ethics Committee, where the School has been represented from the start. The University Research Integrity and Governance Office provides guidance on proposals and ethical review submissions. The School works closely with the University's legal department over aspects including contractors, and sub-contracts for research partners. Data is stored securely, maintaining subject confidentiality where relevant, and preventing unauthorised access or loss.

## **2. People**

At the census date, the School's staff comprised of 8 full-time Professors, 6 part-time Professors (including 2 VC Fellows), 7 Readers (including 2 part-time), 8 Senior Lecturers (including 2 part-time), 5 Lecturers (2 part-time or on leave), 3 Senior Teaching Fellows, and 4 Teaching Fellows. Over 25% of staff are women and 16 nationalities are represented, giving the School a truly international flavour. Many staff have also received postgraduate training and/or have previously worked overseas, allowing the school to benefit from experience gained in top departments worldwide. 13 staff members have PhDs from the top 20 Economics Departments in the World (most recent QS rankings).

### **2.1 Staff recruitment and development strategy**

The 2017 School of Economics' Strategic Plan states that "The School's number one priority and key to delivery of our action plan is to hire and retain excellent staff." We have taken a three-pronged approach to recruitment.

At the junior level, our recruitment is based on annual participation (since 2014) in the American Economic Association academic job market, complemented with participation in the European and British job markets. In each year, we have interviewed up to 80 candidates, and invited 15-20 of them to Surrey for full day visits and job talks. Over the last five years, this has led to 9 junior colleagues joining us (Blow, Camponovo, Garfagnini, Joo, Laczó, Moscelli, and Shakhnov, and in 2020 Volpicella and Laohakunakorn). As well as enabling us to recruit excellent young colleagues, this strategy has the additional benefit of bringing many outstanding candidates to Surrey and giving colleagues and PGRs the opportunity to hear papers at the frontier of the discipline. It should be noted that the School's recruitment effort has been supported by the University through the introduction of exceptions to the recruitment policies which allow the School to be competitive in the fast-paced economics job market.

At the mid-level we have taken advantage of opportunities for additional hires and made 2 appointments at the Senior Lecturer level (Koppensteiner and Oikonomou) and 1 at the Reader level (Karantounias), who started in December 2020.

At senior level, we made 6 professorial appointments during this REF cycle (Breinlich, Jensen, Nunes, Parey, Santos Silva, and Zanardi who joined in 2021 as the new Head of School). These senior appointments, which include two Heads of School, have not only strengthened our research capability in core areas, but also provide leadership and mentoring of junior colleagues and PhD students. All these appointments were carefully considered and are in line with our strategic objective of having a diverse and balanced School that engages in research at the frontier while attracting research funding and delivering strong impact.

The School was also very successful with appointments as part of the University's Vice-Chancellor Fellowships scheme. As a result, Kjetil Storesletten (Oslo) and Volker Nocke (Mannheim) joined the School early in 2020 on 0.2 FTE contracts. The appointment of these world-renowned academics increases the visibility of the School, stimulates our research environment, enhances our ability to attract substantial research grants, provides mentorship to colleagues, and contributes to an even better PhD programme. Both VC Fellows maintain frequent contact with colleagues and visit regularly. They have already played a decisive part in the success of our 2020 job market season and are actively developing research projects and bids with colleagues (for

example Nocke is working with Breinlich and Jaimovich on first-mover advantage in export markets).

As noted above, an indication of the School's excellent performance is that we have achieved great success with promotions in this REF period, with five colleagues (Blow, Bozbay, Chitnis, Garfagnini, Moscelli) promoted to Senior Lecturer, four of whom were hired since the last REF. Five colleagues have also been promoted to Reader (Blanden, Cantore, Jaimovich, Martellosio, Srisuma). Colleagues with teaching-only contracts also achieved significant success with promotions. During this REF cycle we had one promotion to Principal Teaching Fellow and two promotions to Senior Teaching Fellow. This is a testament to the crucial contribution these colleagues make to the productive and harmonious environment of the School.

Research and impact success has been ensured through several mechanisms.

a) *Ensuring sufficient time for research.*

The teaching load for staff on research and teaching contracts has been substantially reduced since the last REF. This was the most important strategic action taken to encourage research productivity and a more sustainable research environment. Staff cover no more than two modules per year (corresponding to 44 contact hours), and many concentrate their teaching into one semester to provide focused time for research. In line with the rest of the University, the School uses a Workload Allocation Model to ensure that workloads are balanced, and that time is protected for research. Where research time is specified in funding applications, this is built into the Model, irrespective of whether the funder directly covers overheads or salary costs. The University continues to operate a sabbatical system and in every academic year of this REF period the School received at least one application for sabbatical leave; all requests were approved.

b) *Formal and informal support*

The School's supportive environment offers numerous informal opportunities for junior colleagues to learn from other colleagues. There are also several formal arrangements in place. New Lecturers usually have a 3-year probation period where targets are set and monitored. They are supported in this process by an assigned Senior Colleague. All Lecturers and Senior Lecturers have access to a mentor allocated specifically to support their research. Mentors provide advice on research, funding and publication strategy, and offer an independent listening ear to discuss all aspects of academic life. All grant applications are subject to an agile peer review process at the School and Faculty level. A wide range of additional research-focused developmental activities are available through the Faculty and University. These include courses aimed at developing leadership and management skills, and staff are encouraged to attend these; Blanden, Cantore, Nunes and Santos Silva have undertaken Senior Leadership training during this REF cycle. The University joined the Aurora national Women's Leadership Programme on its launch and Blanden attended in the first cohort.

All staff have an annual appraisal with the Head of School which focuses on progress towards meeting targets and career development; completion rates are 100%. Alongside teaching, targets relate to outputs, impact, and contributions to the wider research base. This appraisal process is an important part of helping colleagues work towards promotion. Targets are also used to effectively manage workloads and to regularly review the culture of the School. The School takes the results of the annual Staff Survey very seriously, raising relevant matters in Staff Meetings, and following up as necessary. As noted in the *Concordat to Support the Career Development of Researchers*, promoting good mental health and wellbeing is a core component of good research, and the Head of School takes care to encourage an open discussion around wellbeing issues. These of course, have been particularly relevant since March 2020 and the School has responded by scheduling regular catch-ups between staff

members and between faculty and the Head of School, as well as making more use of Microsoft Teams to encourage informal communication.

*c) Facilitating transitions into and out of academia*

During this REF cycle, five colleagues decided either to take permanent (Avitabile, Holden, Cantore) or temporary (Hunt, Dumitru) positions in non-academic institutions. In all these cases, the School was very flexible and facilitated these transitions either by providing unpaid leave or by offering the researchers fractional contracts that allow them to continue to contribute to the School while having the freedom to pursue new opportunities. These links keep a door open in case they decide to return to the School full-time and allow the School to benefit from their professional experience in prestigious institutions, all of which have a substantial research reputation, and provide opportunities for policy impact (Bank of England, Bundesbank, World Bank and King Abdullah Petroleum Studies and Research Center in Saudi Arabia).

## 2.2 PGR and ECR training and support

### *The PhD programme*

The new [PhD programme](#) that started in 2015 (with a pilot in 2014) has been transformative both for the students who have been part of it, and for the rest of the School.

*a) The structure of PGR training*

The first four cohorts of students enrolled directly on the PhD and, in their first year, undertook core courses in Macroeconomics, Microeconomics, Econometrics and Research Methods, all provided by leading scholars. As part of the Research Methods course students hear from all potential supervisors about their areas of research and their views on good potential PhD routes. The objective has been to enable students to effectively match with supervisors. In the second year, students completed six other state-of-the-art modules which enable the students to move beyond their core knowledge and focus on the techniques to be used in their research.

Following their taught courses, all students go through the Confirmation process within 24 months of their registration. This process requires students to submit their first chapter, which they present to the School. This is formally examined by two members of the School faculty who are not part of the supervision team. Following Confirmation, students are required to present annually as part of their group seminar series. They also regularly present to each other, particularly in preparation for conference presentations.

Over time, we made several adjustments to the structure of the programme, the most important of which was the introduction of a new MRes from the Autumn of 2019. This MRes is formed from the modules that were previously offered in the first year of the PhD, with the addition of an advanced research project to be completed over the summer months. Naturally, the modules that were previously taught in the second year now form the first year of the PhD, and the rest of the structure of the programme remains the same. There are several advantages of the new structure with the MRes. It frees up more time for research during the PhD programme and gives students an early qualification in recognition of their studies. In addition, the inclusion of an assessed dissertation gives students early experience of the research and supervision process.

*b) Student support*

All students are allocated a desk and computer with access to appropriate software. We group students in rooms by their year of MRes/PhD entry, which contributes to a strong sense of community. Research students are allocated £3k towards their research expenses during the programme. This can be spent on conference attendance, data or external training. Our



students have been particularly visible at the Royal Economic Society conference with several presenting at both the main and PGR conferences in 2018 and 2019, with 5 others attending in 2018 and 8 attending in 2019. Students have presented at a range of other conferences and workshops including the European Economic Association, the European Meeting of the Econometric Society, and the Money, Macro and Finance Conference. Our students have also visited the Universities of Copenhagen, Venice, GSE Barcelona, Warwick, and LSE, and participated in our own CIMS Summer and Easter Schools, and in summer schools, courses, and master classes offered elsewhere.

Alongside the external training opportunities available to students, the University of Surrey's Doctoral College provides a wide range of additional training; e.g., in 2019/20 some students and supervisors undertook Mindfulness training. The Doctoral College also offers many other workshops and careers guidance. In 2020 Economics PGR students won competitive funding from the Doctoral College to hold an event that is part of the Doctoral College's programme on Building Research Culture. Two of our students have successfully completed the University's Graduate Certificate in Education and another is working towards it.

In March 2020, the University received £100k of funding from the National Productivity Investment Fund-Doctoral Training Programme at ESRC. This supports collaboration between PGRs and private sector firms. One student (Dente) has already benefitted from an intensive training programme on Connecting and Engaging Researchers with Business, and we will be encouraging more to participate in these activities.

Some PhD students have received additional support through employment in the School; this takes the form of fixed-term contracts that enhance their employability. Both Swarbrick and Boye have provided research and administrative support to CIMS, paid partially by income generated by CIMS. This was especially beneficial for Swarbrick, and paved the way for his recruitment to the Bank of Canada, from where he continues to collaborate with Surrey colleagues (he co-authors one of the outputs submitted in REF2021). Mello has recently accepted an 80% post-doctoral position to work on Moscelli's NHS staff retention project. This will start after he submits his PhD and run until 2023.

#### c) *PGR recruitment*

The new MRes/PhD has attracted between five and six students a year; students originate from 15 different countries and over 35% are women. Our MRes/PhD students have been recruited through wide advertisement and we select students based on their GRE score and an interview. The programme is supported by the scholarships provided by the Faculty; 90% of our students receive a full scholarship and funding for fees. As well as being supported by the School and Faculty, five of our students (Swarbrick, Grilli, Higgins, Alvaro-Taus and Phella) also attracted funding from the relevant Doctoral Training Partnership (SENSS) and directly from the ESRC.

The PGR community has been complemented with visiting students, most notably from the "Expectations and Social Influence Dynamics in Economics" PhD programme (ExSIDE), a multidisciplinary programme funded by the European Commission. These students complete their PhDs between two institutions, and the programme includes training in behavioural economics, psychoanalysis, opinion formation, network theory, agent-based simulation and economic modelling, complemented with extensive training in transferable skills. The three students on the Surrey-Bielefeld part of the programme visited Surrey in 2017/18 taking the 2nd year PhD courses and returned in 2019/20. Chitnis also hosted a PhD student from the University of Santiago de Compostela; this led to a joint paper applying techniques from energy economics to the waste-water industry.

*d) Outcomes*

The employability of our graduates has been greatly enhanced by the new PhD programme and there has been a qualitative shift in the placement of students. Of the students in the first cohort, two placed at the ECB (one, Grilli, on an extended internship before moving to the OECD, and the other, Rhouma, on the graduate programme), one (Rahimi) at the Financial Conduct Authority, one (Rahman) at Frontier Economics, and one at a teaching position at Sussex (Rondina). Additionally, Tsiaras, who moved from Leicester to complete his PhD at Surrey, took up a postdoc position at the European University Institute. Of the second cohort, graduating in 2020/21, Higgins is at the University of Cambridge on a postdoc associated with Koen Jochmans's ERC grant, Oparina is working in the Wellbeing Programme at the Centre for Economic Performance LSE, Dente is working at Lear (an economics consultancy), and Phella is doing an internship at the ECB and has just accepted a Lectureship position at Glasgow.

In addition to the students from the new programme, 19 other students have completed since the previous REF (including 2 from the pilot year of the new programme). These students moved on to a mix of private sector and university positions around the world, including at the Bank of Canada, Central Bank of Nigeria, the University of Portsmouth, University of East Anglia (and from there to Kings College London), University of Birmingham, and KBR consulting.

*Post-doctoral researchers*

During this REF period the School has employed 10 Post-Doctoral Research Fellows: Chatzistamoulou, Deak, Elkomy, Laliotis, Mirfatah, Mirza, Mukerjee, Murad, Sayli, and Taneja. All have been on fixed-term contracts commensurate with the length of the project they worked on; these have varied from one year up to five years in the case of the 4 researchers working on "Better for Less". These Research Fellows benefitted from and contributed to the thriving research environment in the School and were mentored by the leaders of the projects on which they were involved. Several of these colleagues have moved on to full time academic positions with Laliotis now at City, Murad at Portsmouth, Deak at Exeter, Mirza at Birmingham. Mukherjee is undertaking further research at Technische Universitaet Muenchen, while Elkomy continues to research and teach at Surrey.

**2.3 Support and promotion for Equity, Diversity and Inclusion (EDI)**

EDI is valued and actively and effectively promoted at University and School level.

The University commitment to EDI principles is evidenced by participation in various national schemes, e.g. Athena SWAN, Disability Confident, Race Equality Charter Mark, Stonewall Workplace Equality Index. Across the University, we have the Rainbow Allies scheme to enable staff to show their support for our LGBTQI+ colleagues, and we have established Mental Health First Aid and LGBTQI+ Awareness training for staff. Furthermore, the University organises many celebratory events throughout the year, such as events that commemorate Holocaust Memorial Day, International Women's Day, LGBT History Month, Black History Month, Trans Memorial Day and Disability Awareness Week.

This ethos is also evident in other University-wide practices that directly involve the School of Economics. For example, the School is working towards Athena SWAN accreditation, and online Unconscious Bias training is mandatory for all staff, with face-to-face training on this topic being mandatory for those involved in recruitment, disciplinary and promotion procedures. Therefore, EDI is always actively considered in all job-market decisions at the School level, and we make sure that the interview panels and the short-lists of candidates are diverse and balanced.

The good practices at the University level are fed back to the School by our representatives on the Faculty EDI committee, but the School also takes many initiatives to promote EDI. For

example, all group meetings and seminars are held between the core hours of 10am to 4pm. Policies also allow for a phased return to work following parental leave or periods of illness, and the School has been very flexible in these cases. Caring responsibilities and health needs are also considered when organising any necessary travel to support research, with colleagues being authorised to use more expensive modes of travel when that is more convenient and justified.

Flexibility and work-life balance is greatly assisted by the low teaching loads in the School, which allow colleagues to organise their research and other commitments in a way that, for example, suits their caring responsibilities or health needs. Moreover, the School has regularly championed more flexible working practices at the University level and some success has been achieved. These flexible practices allowing a good work-life balance gained a new impetus and a new importance with the COVID-19 pandemic, with all members of staff being able to work remotely and effectively while caring for their families.

All staff can apply for flexible working arrangements with regards to the timetabling of their teaching, and many do. No members of staff work part-time for family reasons and we would argue that this is testament to the School's ability to accommodate their need for flexibility in other ways. Several colleagues have fractional appointments either because they are in partial retirement, or because they have positions in other institutions. As noted above, the School also facilitates transitions between academia and industry. Tabasso is currently on unpaid leave while taking up a Marie-Curie Fellowship.

Teaching and research in the School also address EDI related issues. Pay gaps and labour-market discrimination are discussed in several modules, and the second-year module World Economic History covers women's rights, colonialism and decolonisation. Recently, Blanden and PGR Dente contributed to the Gender Pay Gaps in Medicine Review led by Surrey Business School.

Finally, the School paid considerable regard to EDI in the construction of the REF2021 submission. Following the published Code of Practice, output selection was conducted at UOA level output selection panel meetings held in accordance with guidance set by the University's REF2021 Team. Members of the University's REF2021 Team and of the University's EDI Team were present, and all attendees completed REF2021 EDI training. Membership of the output selection panels took account of the population characteristics of the UOA.

### **3. Income, infrastructure and facilities**

All offices for staff and PhD students are located on the ground floor of the Elizabeth Fry Building; this facilitates interactions between colleagues and students, and contributes to the sense of community. All permanent members of staff have individual offices with appropriate IT equipment and software and, as noted before, each cohort of the MRes/PhD programme has a dedicated room. The same space also houses dedicated computer labs for MA/MSc and MRes/PhD students, and we have just installed an experimental lab (in collaboration with the Surrey Business School), which was funded by the Faculty.

The School has recently secured around £60k of funding from the University to expand its research computing capability and we now have a server with 384 cores, 12TB RAM and 100TB of file-storage. The server, which complements the existing HPC computer environment used by the School, is equipped with Stata MP, R, and Python. This brings us to the frontier in terms of working with very large datasets and allows researchers to perform computationally intensive operations on the largest administrative datasets available today. Having access to this facility widens the scope of research grants we can apply for and will facilitate collaborations with colleagues from other institutions who may want to benefit from this computing capacity. Through the Health foundation project led by Moscelli, the School (with co-funding from the University) has also created a separate secure IT infrastructure to host and analyse sensitive administrative health data such as the Hospital Episode Statistics. Having access to such data opens the possibility for new funding opportunities and collaborations in the domain of public healthcare and related studies. Furthermore, we are working with the Chief Information Security Officer on the

reorganisation of the information governance processes; this will open up opportunities for further use of confidential data.

At REF2014, most of the School's research funding came through SHEC. This Centre was very successful at obtaining multiple small to medium grants related to health evaluation, but these rarely led to publications in economics journals. This approach changed markedly leading up to and following SHEC's move to the Faculty of Health and Medical Science in 2018. The School now focuses on obtaining larger grants with the potential to lead to impact and high-quality publications in economics. In the four financial years between 2016/17 and 2019/20 the School has raised between £450k-£500k annually, without including SHEC's contribution (compared with <£200k in the years before that) and has seen a steady widening of the pool of individuals involved in grant applications. Therefore, the new approach has been very successful in that it allows SHEC to develop its full potential in a more natural home, while allowing the School to focus on projects that are better aligned with its strategic objectives, while being able to more than compensate for the loss of SHEC's research income; overall, the School's annual research income has grown by more than 20% relative to the previous REF period.

Research funding has come from the ESRC (McNally for the Industrial Strategy and for her work at the CEP, Breinlich and Santos Silva for the estimation of trade models; and Breinlich, Corradi and Santos Silva for the application of machine learning techniques in international trade research, Levine and Holden on Agent-Based Modelling, Chitnis as part of CREDS, also funded by the EPSRC), the British Academy (Corradi, Srisuma and Carmona have received separate awards), the Nuffield Foundation (Blanden on the Early Years' workforce), the European Commission (Holden on research and innovation, Chitnis on Sustainability for the Energy Poor, Levine to fund the ExSIDE PhD programme and CIMS on Macro-Modelling), The Health Foundation (Moscelli and Blanden's recent £550k award to investigate NHS staff retention over four years), and a private donation (£200k to fund a project on the Macro-Modelling of Emerging Economies). Effectively a further £500k was awarded in 2016 when the Leverhulme Research Leadership Grant "Better for Less" on public sector productivity was transferred to the School of Economics from the Surrey Business School.

CIMS has a long history of successful collaborative funding applications, and joint bids are becoming increasingly common among researchers in other groups. The projects from Breinlich and Santos Silva, Breinlich, Corradi, and Santos Silva, and Moscelli and Blanden have already been mentioned. These are particularly important as the Breinlich-led ESRC bids are examples of work across the research groups, while the Moscelli-Blanden project shows successful mentoring; Moscelli applied for the grant in his first year at Surrey and benefitted from Blanden's experience, especially on those aspects of the bid which related to impact. In addition, Blanden and Koppensteiner have been exploring combining their expertise to study Early Years interventions in Brazil.

In addition to leading a growing number of funded projects, the School has also been a partner in several successful multidisciplinary projects over the REF period. Levine and Holden joint with Surrey's Department of Sociology received £620k to investigate the connection between DSGE Models and Agent Based Modelling, a core area of expertise in Sociology at Surrey. This project led to three papers, and the growth of a new area of research at Surrey in Behavioural Macroeconomics (with four Surrey PhD students involved in this area) and the ExSIDE multidisciplinary doctoral programme previously mentioned. As noted, Chitnis has been contributing to energy demand modelling in large scale projects with international partners. For example, as part of the CREDS project mentioned before, Surrey received around £150k which was used, among other things, to hire a research assistant (Taneja). Blanden and PGR Dente have recently contributed to the [Gender Pay Gaps in Medicine Review](#) led by Surrey Business School, paving the way for future multidisciplinary collaboration on the medical workforce.

Research funding is supported by several Faculty and University initiatives. At Faculty Level, the School benefits from the expertise of a Research Facilitation Officer who informs staff of relevant research funding opportunities, advises on bidding strategy and comments on applications. The



University offers centralised support for drawing up research budgets and a dedicated bid development team for larger bids. Economics Staff have benefitted from Faculty pump-priming support (received by Bozbay, Gabriel and Corradi). Parey and Koppensteiner both received Faculty Research Fellowships in 2020 to provide support and teaching buy-out while they prepare sizeable bids.

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

##### **4.1 Academic contributions**

As evidenced by their numerous publications in leading journals, members of the four groups have made important intellectual contributions that were well received by the profession (e.g., Blow's paper received the 2017 Atkinson Award for best paper published in JPubE and Santos Silva's Journal of Econometrics paper currently tops the [list](#) of most cited papers in that journal). Many of these contributions are the result of joint work with researchers in other national and international institutions, who are part of an expanding research network. The School's contribution to the research base is also reflected in the participation in the international PhD programme mentioned before (ExSIDE) and by the formal collaborations of several academics with other research institutions: Blanden, Breinlich, McNally and Witt have strong affiliations with the Centre for Economic Performance, LSE; Blow is a Research Associate at IFS; Breinlich is a CEPR Research Fellow; Parey is a Research Fellow at the Institute for Fiscal Studies (IFS) and at the Institute for the Study of Labor (IZA), a Research Associate at Zentrum für Europäische Wirtschaftsforschung (ZEW), and a Visiting Fellow at the Department of Economics at Essex.

##### **4.2 Contributions outside academia**

CIMS has run an annual Summer School in DSGE modelling since 2012. Since 2015 CIMS has held an Easter School, which since 2016 has specialised in DSGE models for emerging economies. In addition to the courses at Surrey, CIMS has been offering bespoke courses since 2010, having delivered courses at the Scottish Doctoral programme and at institutions such as the Central Bank of Nigeria and the Bank of Portugal, as well as pre-conference courses before the Money Macro and Finance Society conference (in 2016 and 2019) and the Society for Computational Economics conference (CEF) in 2019. The courses provide training on the construction of DSGE models, systems estimation and their use for policy analysis, that takes participants to the frontiers of the subject. Close to 400 PhD students, academics and researchers from central banks and finance ministries have attended these courses. They include participants from 22 policy institutions including 16 national central banks, the European Central Bank and World Bank; the International Labour Organization, the Netherlands Bureau for Economic Policy Analysis, the South East Asian Central Banks (SEACEN), and the Slovakian Council for budget responsibility.

Links between CIMS and central banks have strengthened in several other ways over this REF period. Holden's tools and algorithms for the simulation of macro models with the zero-lower bound are heavily used by central banks and are part of their everyday policy-making process; this contribution led to Holden joining the Bundesbank in 2018 while on fractional contract at Surrey. Similarly, Cantore joined the Bank of England in 2018 but has a fractional appointment at Surrey. Holden and Levine's PhD student Swarbrick works at the Bank of Canada and continues to work with Surrey colleagues. CIMS is also collaborating with the Bank of Portugal, and this has been supported by pump-priming money from the Faculty. Nunes, with the support from the ESRC Impact Acceleration Account, presented his work on reformulating objectives of central banks to key policy makers at the Boston Fed; this work was also mentioned in the parliamentary committee revising the objectives of the Swedish central bank (as highlighted in the Impact Case Study).

The Applied Micro group has been highly effective in engaging with non-academic stakeholders and offering policy advice. Rickman has continued his work on the legal system, as a member of UCL's Mayson Review of Regulation of Legal Services and as an Expert Advisor to the Master of the Rolls' Review of Civil Court "Guideline Hourly Rates". He has also received funding from the



Dutch Government to help them understand the costs and benefits of the judiciary. McNally has had extremely broad-ranging influence on education policy makers, particularly through her work on Vocational Education, which was heavily referenced in the Augar Review (further details are contained in her Impact Case Study). Koppensteiner has influenced policy on Crime and Health, both in the UK and in Brazil. His work on domestic violence in Leicester continues to inform policing strategies there and elsewhere (e.g., Chester, Essex, and Sussex), and he advises the Brazilian Government on dengue fever prevention and the Minas Gerais State Secretariat on Public Safety on the prevention of crime. Chitnis has advised the National Environmental Agency of Singapore on rebound effects in energy demand. While at Surrey, Avitabile carried out important work evaluating a policy to support the education of the most disadvantaged in Mexico; this has had a huge impact on the opportunities available to the poorest children there. Blanden's engagement with early years stakeholders has led to a rethink of some of the received wisdom in this sector (as highlighted in her Impact Case Study) and she has continued to promote her work on social mobility, which was highlighted in an Impact Case Study for the previous REF, engaging with the public, press and policy makers on this issue. Colleagues have also provided evidence (verbal and written) to several Parliamentary Select Committees. As mentioned before, Breinlich, Corradi and Santos Silva are working with researchers at the World Bank on the impact of free trade agreements.

Members of the School have or had significant advisory roles. Nunes served on the Council of Economic Advisors for Chancellor of the Exchequer, Philip Hammond, (McNally also presented to this group), Breinlich is a former member of the Department of International Trade's Strategic Trade Advisory Group, Koppensteiner is a member of the UK Government's What Works Trial Advice Panel, and Rickman has just been appointed to the Expert Panel of the Independent Review of Criminal Legal Aid.

Finally, Santos Silva made over 1800 contributions to [Statalist](#), mostly replying to questions on his highly-cited work on the estimation of gravity equations for trade and on his recent work on the estimation of quantile regressions with fixed effects.

#### **4.3 Positions of wider influence and contributions to the discipline**

Colleagues from the School are active in journal editing, conference organisation and membership of learned organisations. Corradi serves as associate editor for the Journal of Econometrics, Econometric Theory, Econometrics Journal, and the Journal of Banking and Finance. Gershkov has served as an editor of the Review of Economic Studies and is an Associate Editor of the International Journal of Game Theory; Carmona is on the editorial board for Economic Theory; McNally is associate editor of the Economics of Education Review; Blanden is an editor of the World of Labor series for policy makers. Rickman is an Associate editor of International Review of Law and Economics; Santos Silva is on the Advisory Board of the Portuguese Economic Journal; Parey edits Fiscal Studies while Breinlich is on the editorial board of International Economics. Blanden, Breinlich, Koppensteiner, McNally and Santos Silva are members of the ESRC Peer Review College.

Storesletten serves on the executive committee of the European Economics Association and is its Past President, McNally sits on the executive committee of the European Association of Labor Economists, while Corradi represents Europe in the Econometric Society. Rickman served as a Member of the Royal Economic Society Executive Committee, 2006-2018. Blanden, Breinlich, Gabriel, Jaimovich and Santos Silva have been on the programme committee for the Royal Economic Society, Blanden has worked on the programme of the European Economic Association and Srisuma helped shape the 2020 World Congress of the Econometric Society.