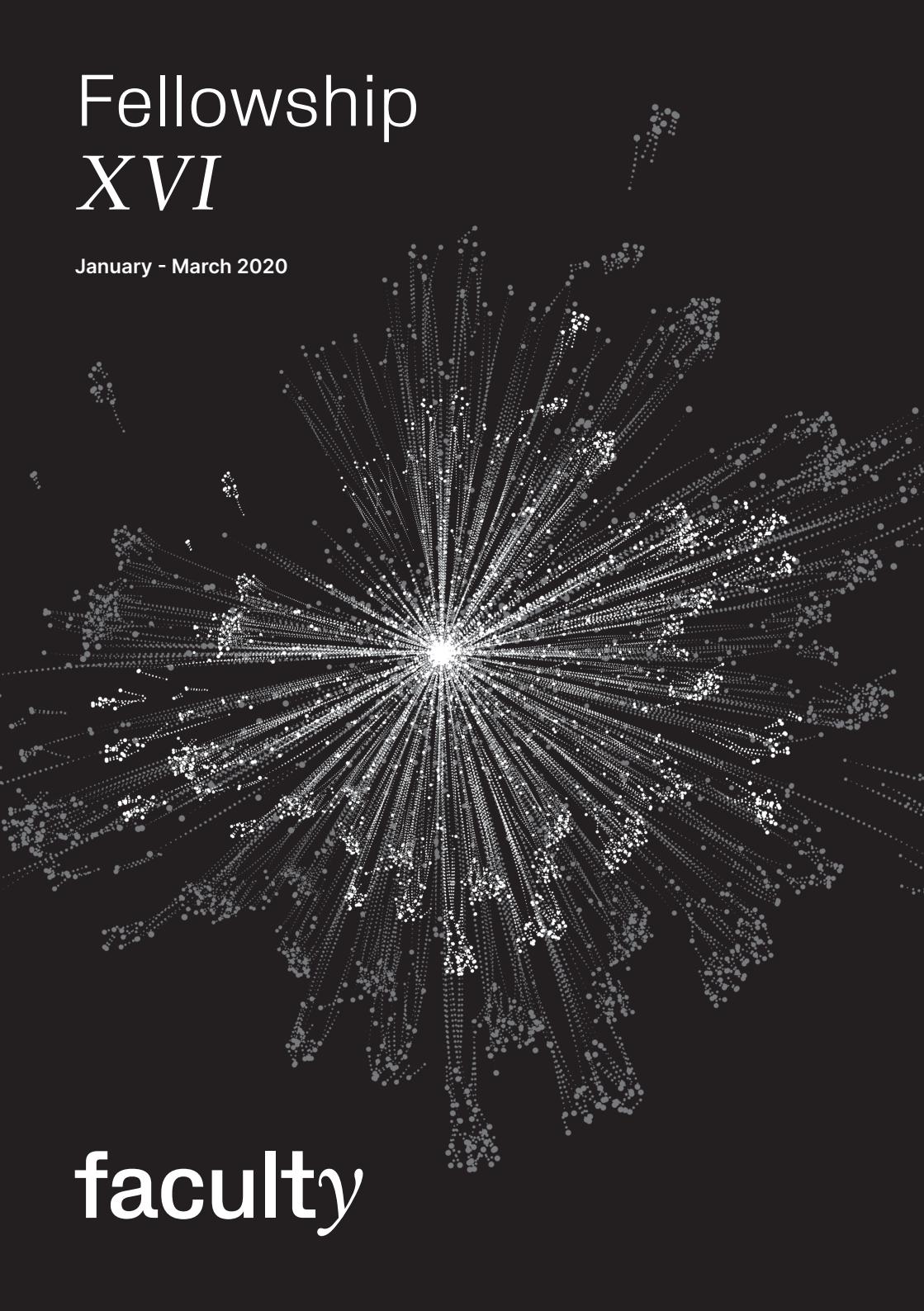
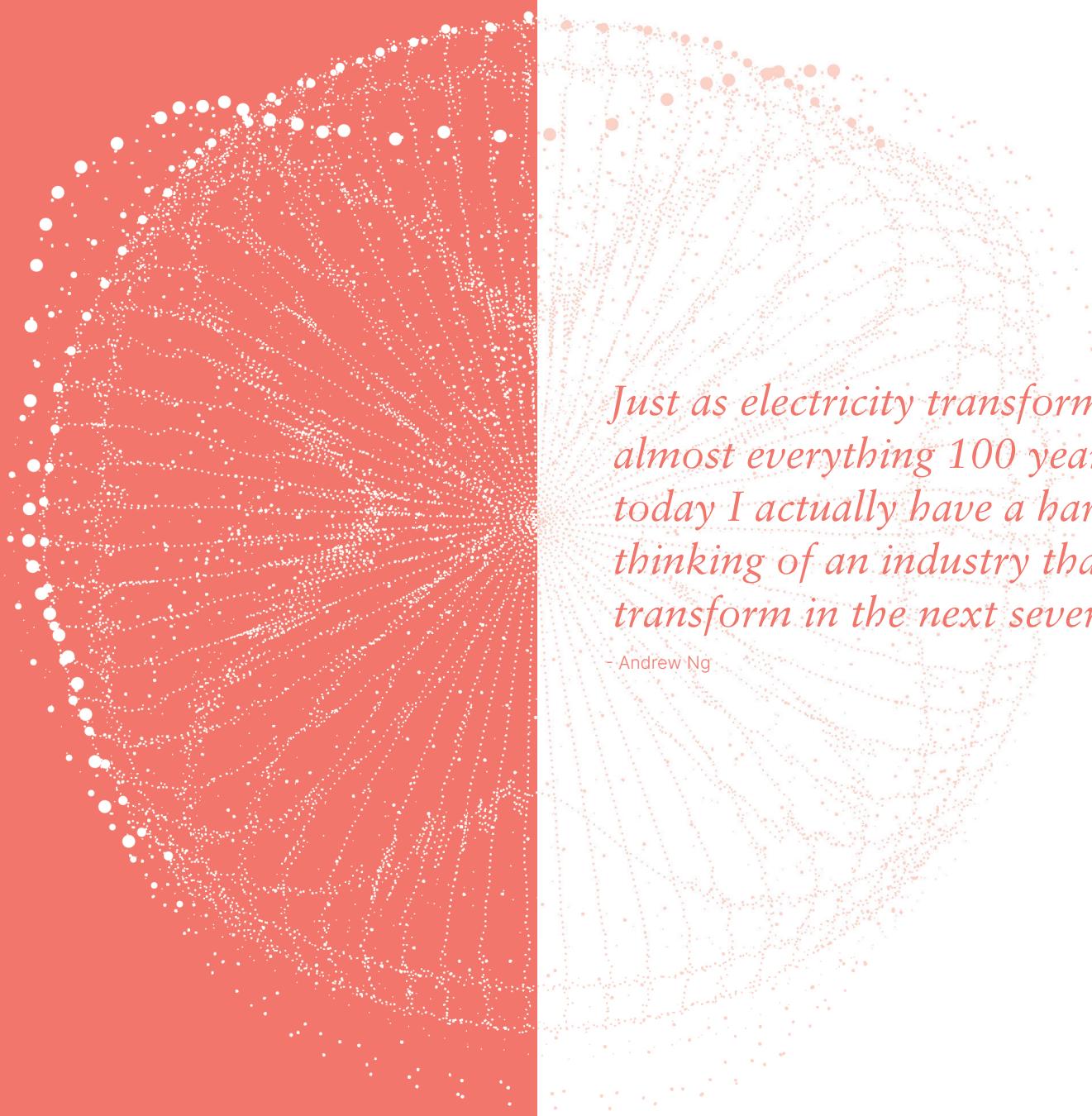


Fellowship *XVI*

A large, intricate abstract graphic design composed of numerous small, glowing white dots. These dots are arranged in complex, branching patterns that radiate from a central bright point at the bottom center. The patterns resemble fireworks or a starburst, with many lines of dots extending upwards and outwards towards the edges of the frame. Some smaller clusters of dots are also visible in the upper left and right corners.

January - March 2020

faculty

A large, abstract graphic occupies the right side of the slide. It consists of numerous small, glowing white and orange dots connected by thin lines, forming a complex, organic shape that resembles a neural network or a molecular lattice. The dots are more concentrated at the top and bottom edges, creating a sense of depth and perspective.

*Just as electricity transformed
almost everything 100 years ago,
today I actually have a hard time
thinking of an industry that AI won't
transform in the next several years,*

– Andrew Ng

About the Faculty fellowship

Europe's leading route to hiring elite technical data science talent

Faculty is on a mission to apply transformational AI technology to tangible, real-world problems by combining a prestigious academic heritage with commercial expertise.

The Faculty fellowship exists to ensure that the brightest academics get a chance to immerse themselves in working life, learn about artificial intelligence in business and help build the future of operational AI. And for employers, it's a chance to make a risk-free hire of an analytically-minded and highly talented new data scientist.

The eight-week programme is developed in conjunction with industry and academic partners and includes a real six-week data science or engineering project. The best projects support genuine business needs, and some past projects have resulted in millions of pounds of revenue or cost savings for their companies.

Our programme is competitive, and we currently attract applications from 5–10% of the UK's physics, maths and engineering postgraduate research students. That's in part because our alumni go on to work in all sorts of different organisations from big names like Google DeepMind and Facebook to startups like Babylon Health and Deliveroo.

At Faculty, we value education—and we're proud to play our part in ensuring that the next generation of Europe's AI problem-solvers are building world-class products and services.



1877

UK & EU STEM PhDs have applied to the fellowship so far

160+

Companies & organisations have hired from the fellowship since 2014

30+

Fellows have been hired by Faculty

98%

Fellows have successfully transitioned and are now working in the industry

“

I've highly recommended the fellowship to others. It's a great way to find very bright Data Scientists and complete well defined Data Science projects.

Harvinder Atwal
Chief Data Officer, MoneySuperMarket

We would like to thank the following organisations, who were incredibly helpful in providing data, guidance, and commercial wisdom for Faculty fellowship XV:



Meet the fellows

The newest cohort of world-class data scientists and engineers

The biographies of the fellows reveal an incredible pool of talent and skill including their technical achievements, awards and certificates, world-leading expertise and discoveries.

What these introductions do not describe is their warmth and generosity, their grit and determination, and their drive to make the world a better place through data science.

Over the last eight weeks, they have filled our office with excitement, shown resilience in the midst of long hours and courageously approached every challenge set before them. These fellows are everything you see on paper and so much more.





Daniel Leirer

PhD Biostatistics
& Health
Informatics

King's College London

Ebury

Daniel is an interdisciplinary scientist who studied the link between our genes and environment on psychiatric disease.

During his PhD, he used unsupervised machine learning to identify medication-related gene clusters. He also developed a pipeline to build robust ensemble models that predict disease from genetic and clinical data.

After his PhD, Daniel worked for Bioepic, a biotechnology startup, developing a health insights mobile app. His work focused on replicating the performance of neural networks, building regression and classification models that could be more easily interpreted by the CEO and management.

After his PhD, Daniel worked for Bioepic, a biotechnology startup, developing a health insights mobile app. His work focused on replicating the performance of neural networks, building regression and classification models that could be more easily interpreted by the CEO and management.

David is a particle physicist who searched for heavy new particles using data gathered at CERN's Large Hadron Collider.

He worked on resolving close-by particles in order to improve the efficiency of previous algorithms. David presented at international conferences and participated in outreach and teaching opportunities.

For his PhD, David prototyped a deep-learning classifier that separates new particle signatures from background processes with similar signatures. For his Masters, he identified errors in the simulation data of the LHCb experiment that changed and improved the way the simulation was performed.

During his fellowship, David has been working with Rolls Royce Motor Cars to predict the number of defects in each car that passes through its assembly line. Each bespoke car is handmade, so each defect costs time and money to fix; predicting where defects will appear allows Rolls Royce to minimise their occurrence and significantly reduce production costs.



David Lack

PhD Experimental
Particle Physics

University of
Manchester

Rolls Royce
Motor Cars

“ Today's abundance of data provides an unprecedented opportunity to gain understanding in almost all aspects of the human endeavour. I can't think of anything more rewarding than being part of that.

“ Company data holds a massive amount of information. The fellowship has given me the skillset and the chance to bring that information to the light.



Ekaterina Kapitonova

PhD Cell &
Molecular Biology

University of
Edinburgh

Just Eat

Ekaterina is a molecular biologist who studied the organisation of DNA within cells, using yeast to develop and validate new methods that assess the levels of DNA compaction.

She presented her work at various symposiums and was heavily involved in teaching.

During her PhD, Ekaterina wrote Python pipeline to analyse gene expression in yeast cells. She also made use of publicly available datasets to build her knowledge of supervised and unsupervised machine learning techniques. In particular, she used quantitative data from different cancer types to predict the progression of cancer.

For her fellowship project, Ekaterina was allocated to food delivery company Just Eat. She used natural language processing and supervised classification methods to develop an algorithm that can cluster similar items together with high precision. This improved clustering will allow Just Eat to standardise menus, improving customer experience as a result.

“As the world ushers in the age of big data, there is nothing more exciting than to be at the forefront of this exploding new field.

Emma is a mathematician specialising in fluid dynamics.

Her PhD, sponsored by Airbus, focused on computationally simulating the impact of very small surface imperfections on wing performance. Emma used high order spectral element methods for her Computational Fluid Dynamic (CFD) simulations and has presented her findings at multiple international conferences.

She wrote an extensive Python tool to manipulate large data output from the CFD for input into a stability modelling toolset. She has spent over a year at Airbus, using her tools to help the company meet its commercial deliverables. Emma has also completed a machine learning course at Imperial College University.

Emma completed her fellowship project with Robin AI. The company is a startup, aiming to provide an efficient contract review service for banks and law firms by combining the best of machine learning and humans to provide an AI+ product. Emma has been using natural language processing to classify important statements from contracts.

“I am continually amazed by the sheer variety of problems machine learning can be applied to and the acceleration of the technology. I, for one, want in on the excitement.



Emma Cooke

PhD Mathematics

Imperial College
London

Robin AI



Erick Hinds Mingo

PhD Theoretical
Physics

Imperial College
London

Faculty

Erick studied how irreversible phenomena manifest themselves in quantum systems.

Using ideas from quantum information theory, he developed a new framework for understanding energetic driving processes that preserve quantum effects. Erick was able to use this to explain results in quantum thermodynamics. He has presented his findings at numerous international conferences.

Erick has previously acted as a consultant, working with a company to map out a timeline for quantum computing milestones. He was also involved in teaching throughout his PhD and was nominated for Graduate Teaching Assistant of the Year at the Student Academic Choice Awards. Towards the end of his PhD, he took a course on machine learning.

Many advanced ML models are black boxes, obfuscating the features used to come to a conclusion. For models with many features, it can take a prohibitively long time to estimate the importance of an individual feature. During his fellowship, Erick has been working with Faculty to find more efficient ways to evaluate feature importance for machine learning models.

“ Machine learning and big data are revolutionizing many aspects of our lives. The fellowship has allowed me to become involved in the field and hopefully steer it in a direction that is beneficial to others.

Francesca's background is in aerospace engineering, with a focus on fluid mechanics.

During her interdisciplinary PhD, she used numerical low-order modelling techniques and optimisation to predict noise instabilities in gas turbines and aero engines.

Towards the end of her PhD, Francesca developed a strong interest in data science and machine learning. After completing online courses, she gained hands-on experience via workshops and an internship at a London-based startup. During this internship, she used deep-learning techniques to automatically identify images of waste in recycling centres.

During her fellowship, Francesca worked with Attest, a technology platform which offers fast, intuitive consumer research. Francesca worked to extract automated insights from collected data and improve client experience, using explainable AI techniques to understand and identify the key drivers of particular answers to survey data.



Francesca Sogaro

PhD Applied
Mathematics

Imperial College
London

Attest

“ Data science is a rapidly developing field that offers exciting opportunities to work with cutting-edge technologies on real business applications. The fellowship has equipped us with the skills we need to transition into data science.

Artificial intelligence made *real*

Artificial intelligence is the most important technology of our age, but it is only valuable when it is applied in the real world—enhancing products, improving services, and saving lives.

To make AI real we help organisations work out what they could do with AI, and then help them to do it. This requires three things: the right strategy, the right skills, and the right software. We help with all three.

faculty

strategy

AI strategy

Identify the opportunities in your data, and design a strategy for realising them.

AI for executives

A crash course for your leadership team in AI, and what it means for your organisation.

software

Platform

A world-class development environment for your data scientists.

Bespoke software

Custom software, precisely tailored to your needs.

skills

Fellowship

Europe's leading route to hiring elite technical data science talent.

Technical training

Enhance the data science skills of your technical team.

300+

We have completed over 300 commercial projects across almost every industry sector

280+

We have trained and transitioned 280+ PhD STEM grads into data scientist roles through our fellowship programme

5-10%

We receive applications to our fellowship from 5–10% of the UK's physics, maths and engineering postgraduate research students

2x

We doubled the productivity of our data scientists by using Faculty Platform

£10m

We unlocked £10m of savings through an AI model to predict demand for staff in real time

93%

We built a fraud detection system which captured 93% of the fraudulent transactions missed by the previous system

60%

We identified a 60% increase in efficiency of marketing spend

Aviation

Finance

Retail

Would you build a house or buy one?

A new series of Grand Designs started on TV recently. The show takes you on the journey a couple go through when designing and building their own home. You see some incredible architectural achievements and beautiful buildings. What the show reveals is that, despite the enduring romance of self-build, building your own home typically takes longer, costs more and ages you. Mojo Mortgages analysed¹ all 124 episodes to reveal that 80% of the self builds went over budget by an average of £124,000 (34%). Little wonder then that building your own home is not as popular as buying one.

When looking at the world of software I see a similar story. It's still possible to develop a word processor from the ground-up, but few would choose to. In 1999, Goldman Sachs stopped using the word programme it built for itself and integrated Microsoft Word into the workflow for example. It's a similar story for firms that took a self-build route with their CRM systems, or ecommerce platforms in the early 2000s.

I believe that data science will be no different. Most data science teams I speak to today have cobbled together their own set of tools for doing their job.

But the value that a data scientist brings to a company by actually doing data science will always be greater than the value of the time they have to spend building and maintaining their own set of tools for doing data science.

Tasks such as spinning up development environments, sharing data and code, scheduling and running jobs, tracking experiments and productionising models.

So, is it a good idea to meet data scientist needs via grand design or buy something instead? Here are two occasions where we think it's the right decision to invest in your own bespoke Grand Design:

- When there is certainty that it will be fast and easy to build using existing resources.
- When the system is for the core processes that differentiate your company.

Faculty's Ben Gammon weighs up the choices data science teams often face between building or buying a data science platform.

In all other circumstances I would take the best offering from someone else, and here is why:

→ Speed:	→ Simplicity:	→ Cost:	→ Quality:
Buying a data science workbench as something that you can install today is a much faster path to business impact and is infinitely quicker than building one yourself.	If it's complex to build then expertise, maturity and economies of scale come from acquired packages. Most software projects fail – don't take the risk.	The manpower it takes to build a data science platform is an order of magnitude more than buying something off-the-shelf. And, it's easy to forget that 70% of software costs occur after implementation.	The features, support, and future improvements will never be as good as the best off-the-shelf solution.

So, if you're reading this and you know data science could be done better in your company, what could you do? Here are three suggested steps. First - talk to the users! Data scientists are usually best placed to explain the importance of a high quality data science workbench they can use. Second, talk to other companies about their own experiences - for example our website lists some of the companies currently enjoying Faculty Platform. Finally, create a scored and weighted matrix with requirements or challenges you feel you experience on one axis and products that might solve them on the other. Identify the best solution for you, and get in touch with us!

To find out more about our data science platform or request a demo, get in touch:

¹ <https://mojomortgages.com/learn/article/grand-designs-deconstructed>



Kasper Larsen

PhD Theoretical
Physics

Uppsala University

NHS England

Using geometric insights, Kasper developed unfeasible precision calculations to interpret the data from the Large Hadron Collider experiment at CERN.

He obtained his PhD from Uppsala University in 2012, has since held research positions at the University of Amsterdam and ETH Zurich, and held research positions and lectured on neural networks at the University of Southampton.

Kasper's research involved writing publically available software using large-scale parallelised computing to automate particle physics calculations. His software is now used by the scientific community and his research has been cited more than 750 times. Kasper has presented his findings at more than 50 events across Europe and the USA.

During his fellowship, Kasper worked with NHS England, analysing data on medical procedures with a high risk-to-benefit ratio. He developed models to forecast the time required for clinics to reach their goals and to understand the relationship between demographic and waiting-time data. This will allow the NHS to reduce unnecessary procedures, thus reducing risks to patients.

“ Data science provides powerful tools to uncover structure in data and inform business decisions. Faculty has provided me with a unique opportunity to apply these tools to a real-world problem.

During his studies, Kevin developed a numerical method of analysing how molecular vibrations affect particle dynamics in organic photovoltaics.

His analysis has helped answer key questions that allow us to develop more efficient and marketable solar cells. Kevin first-authored publications in top-tier scientific journals and presented his work at an international conference.

During the final year of his studies, Kevin successfully completed several data analysis, data visualization, and machine learning courses. He participates in multiple online data science competitions that apply machine learning to real-world data. In addition, Kevin actively manages his stock portfolio using fundamental analysis.

During his fellowship, Kevin worked with Beekin, a fintech providing an AI-powered data platform for risk management in real estate. He processed and analyzed a large volume of tenant data by applying dimensionality reduction techniques, clustering algorithms, and neural networks. As a result, by more reliably identifying tenant behavior, Kevin helped Beekin to increase its revenue potential.

“ Being a fellow has allowed me to leverage my scientific skills beyond academia, while successfully transitioning into the data science industry.



Kevin-Davis Richler

PhD Theoretical
Physics

University of Grenoble

Beekin



Lora Mak

PhD Computational
Biology

University of East Anglia
(PhD), University of
Cambridge (postdoc)

ThoughtRiver

During her PhD at the John Innes Centre, Lora developed a method for fast molecular 3D structure description and comparison using rotationally invariant shape descriptors.

She also characterised the catalytic mechanisms of two closely related oxalate degrading enzymes using ab initio electronic structure calculations and other computational (bio)chemistry methods.

Lora has more than five years of experience in software and database development. In her postdoc at Cambridge University, in collaboration with Unilever, Lora developed a cheminformatic bioactivity database. This work involved database design, data collection and integration from various sources. She later worked at EMBL-EBI as a software engineer, supporting development and maintenance of the PDB data deposition resources.

For her fellowship project, Lora worked with ThoughtRiver, a company that provides contract pre-screening services to in-house legal teams and law firms. Lora used Natural Language Processing (NLP) methods to create a language model that could understand legal language by optimising mapping between ThoughtRiver's internal legal vocabularies and public BERT vocabularies.

“ A data scientist is only as good as the data they have access to. A data scientist is best if coupled together with a data engineer.

Marius is a psychologist and psychometrician.

As a PhD student, postdoc, and assistant professor, he investigated the impact of individual differences on subjects' lives, developed psychometric assessments, lectured, and managed multiple research projects. His research was published in top-tier, peer-reviewed journals, presented at international conferences, and covered by various media outlets.

Marius routinely used advanced statistical techniques, including dimensionality reduction and modelling longitudinal data, in his research. He collaborated with TIME Magazine to produce an algorithm that provides individualised feedback to website visitors. Marius has further experience in project management, supervision and mentoring and enjoys taking part in prediction competitions.

For his fellowship project, Marius worked with Faculty's Marketing and R&D teams to model the effectiveness of marketing intervention and therefore use resources more efficiently. Marius worked with non-standard, custom neural networks to fine-tune Faculty's customer targeting model.



Marius Leckelt

PhD Psychology

University of
Muenster

Faculty

“ With its ability to help businesses thrive and impact people's lives, it is hard to imagine a more exciting field to work in than data science.



Matías Rodríguez-Vázquez

PhD Theoretical Physics

Université Paris-Saclay

easyJet

Matías is a theoretical physicist with a background in particle physics.

Using advanced computational methods and simulations, he developed data analysis strategies for finding Higgs boson particles at CERN's Large Hadron Collider. Through his research, he derived experimental predictions for testing the most promising particle physics models at the LHC.

In his PhD thesis, Matías worked closely with real and simulated data from particle collisions. He also gained experience in algorithm design and statistical modelling through an internship at Wolfram Research Inc., where he developed statistical packages and optimisation algorithms.

Matías' fellowship took him to easyJet's data science team, where he worked to predict the airline's demand for reserve crew. He used machine learning methods and simulations to estimate the probabilities of various scenarios, allowing easyJet to optimise allocation of standby crew at every airport that the company operates in.

“ Given the amount of data being produced nowadays, we can do excellent quality science out of literally anything. It's down our creativity and innovation to use all this data to produce groundbreaking solutions.

Nick studied the freezing speed of a simple model system, one which has the second largest disagreement between experiment and prediction known to physics.

To do this, Nick used Monte-Carlo simulations and developed new experimental techniques. His work was published in international journals and presented at four conferences.

Nick spent three months at Vitamica, a firm working to improve the diagnosis of antibiotic resistant bacteria. He used neural networks to improve prediction accuracy on bacterial strains that had previously proven difficult to measure. He has also worked with the Satellite Application Catapult, building models to identify fishing ships from GPS information.

During his fellowship, Nick worked with Just Eat to automate menu transcription - a process currently done by hand. Nick used optical character recognition and natural language processing to develop a model that can extract structured content from a menu image. This substantially reduces the number of menus that need hand transcription.



Nicholas Wood

PhD Physics

University of Bristol

Just Eat

“ There are very few fields that combine cutting edge intellectual work and immediate real world impact. Data science is one of them, and the fellowship has been a perfect introduction.



Piotr Krzywkowski

PhD Neuroscience

University of
Heidelberg EMBL

IQVIA

Piotr is a neuroscientist with a background in biotechnology.

During his PhD, he used novel computational models to better understand how the brain integrates spatial information with past experiences to compute fight-or-flight decisions. Piotr worked with top research institutions and presented his research at several international conferences.

For his PhD, Piotr used machine learning algorithms to classify animal brain neuronal network states, which he later used to predict animal emotional states and behaviours. He completed various machine learning courses including computer vision and natural language processing. He has experience in mentoring, scientific project management and coaching.

During his fellowship, Piotr worked in the business operations team at IQVIA, a leading healthcare data science company. His project focused on optimising resource deployment across different sites and role using machine learning techniques. By analysing large datasets, he developed a model that predicted office space utilisation and office requirements for specific roles across IQVIA.

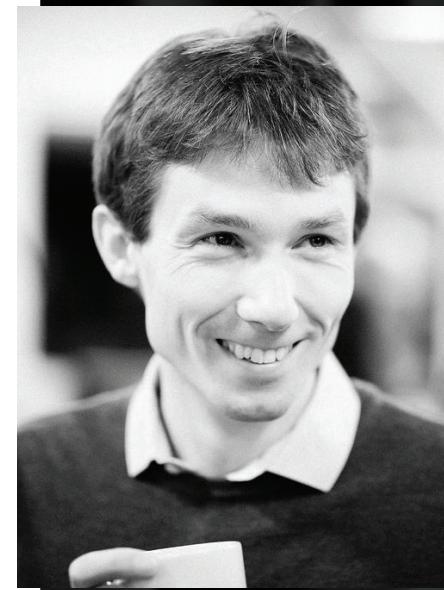
“ Solving hard problems is extremely fulfilling. Using data science to transform businesses and human lives is groundbreaking. Faculty provided me with an opportunity to do both.

During his PhD and postdoctoral research, Robert collected and analysed seismic data from volcanoes, looking for tiny tremors and assessing the eruption hazard of active volcanoes.

Using Monte-Carlo techniques, he created images of molten rock beneath volcanoes in Iceland and Russia.

Robert is a skilled observational scientist, experienced with the management and processing of large and messy datasets and running processing algorithms on Distributed Computing Facilities. Code development was a major component of his research and he contributed to open-source Python packages in the coding community.

Robert's fellowship took place at Enlitened, a company whose social media app for universities is revolutionising student engagement and wellbeing. Robert engineered complex user features and used regression and clustering methods to optimise user retention and the spread of the app across the student population.



Robert Green

PhD Volcano Geophysics

University of Cambridge

Enlitened - The Student Room

“ During this digital age, machine learning and data science will have transformative benefits for both business and society. I'm excited to be a part of it.



Svetlana Chekmasova

PhD Economics

London School of
Economics

Lingvist

Svetlana is an economist whose PhD research focused on understanding why entrepreneurship is a rare career choice, particularly among high-ability individuals.

Her findings revealed that high-ability individuals tend to be cautious about taking risks and had implications for our understanding of the gender gap in business ownership.

Svetlana's robust understanding of causal impact estimation shapes her approach to data analysis. She is used to working with messy data and teasing out the effect of particular features on an outcome. She has taught econometrics to MSc and undergraduate students, and worked on a number of data-driven projects in industry, government and academia.

For her fellowship project, Svetlana worked with language-learning platform Lingvist to predict user retention based on initial user behaviour. By classifying users according to their motivation to learn a language, Svetlana helped Lingvist identify ways to tailor their pricing scheme to encourage each type of learner.

“ Coming from academia, where we try to make sense of the world other people create, it is great to roll up my sleeves and produce useful products with direct impact.

Thomas is an atomic and molecular physicist with a background in laser science.

During his academic career, he used the shortest laser pulses ever created to capture and reconstruct the movement of electrons in molecules. He led several international collaborations and research projects and presented talks in international conferences.

Thomas was involved in a project deploying machine learning techniques to predict the physical properties of the Stanford Linear Particle Accelerator's output. He also built a deep-learning classifier for molecular fragment fingerprints, now used as the main analysis tool in a bio-molecule structural sequencing experiment.

For Thomas' fellowship placement, he worked with BlackRock to build a question-and-answer model that searches for relevant information in strategic and financial reports. Thomas used advanced natural language processing algorithms, combined with a transfer learning method, to create a performing model for finance.

“ Who can see in more than three dimensions? Understanding the complexity of the world pushes us to think outside of this box and machine learning enables it.



Thomas Barillot

PhD Physics

Université Claude
Bernard Lyon 1

BlackRock



Vito Palladino

PhD Particle
Physics

Università di Napoli
'Federico II'

CAFOD

Vito has contributed to a wide range of projects in the field of particle physics.

In his last role, he managed the design and implementation of time-critical algorithms for microsecond decision-making in a multi-terabit bandwidth environment. During his academic career, Vito contributed to several other system modelling, simulation, and algorithm development projects.

He has been involved in a number of outreach activities and has volunteered for environmental and humanitarian causes. He has been involved in more than 30 scientific conferences and has also been invited to speak for non-scientific audiences.

Vito worked with CAFOD, a charity offering aid in developing countries, for his fellowship. In the course of this project, he used machine learning techniques to model the behaviour of CAFOD supporters and forecast their donations over the next two to five years. This information will help CAFOD allocate resources more efficiently for its humanitarian activities.

“ Curiosity is what has brought humanity through history. Today data science feeds it.

William's research focused on searching for new fundamental particles to explain the origins of the universe, analysing some of the world's largest datasets collected by the CERN Large Hadron Collider.

During this time, he led international research teams to perform some of the most precise searches ever made.

In the course of his research, William used supervised and unsupervised machine learning techniques to create classifiers and regressors which optimised his searches. He also spent time as a machine learning researcher at the NASA Frontier Development Lab, designing algorithms to help decipher exoplanet atmospheres.

During his fellowship, William worked with LiveStyled, a technology platform that makes venues and events 'smart' with tailored mobile apps. Using historical purchasing data and app-user data, he developed a 'Netflix-style' product recommendation system to better promote products to customers and improve event revenue.



William Fawcett

PhD Particle
Physics

University of
Oxford

LiveStyled

“ We live in an exciting time where, more than ever before, our ideas can be tested and verified, and new discoveries can be made – all through the use of AI and data science.



Fellowship XVII – May 2020

Host a fellow

Want to tap the world's leading AI talent pipeline? Discover how a Faculty fellow could transform your business or organisation.

fellowship@faculty.ai

faculty

If you're interested in finding out more about how Faculty can help you transition to AI independence, get in touch.



info@faculty.ai

facultyai

faculty.ai

faculty_ai