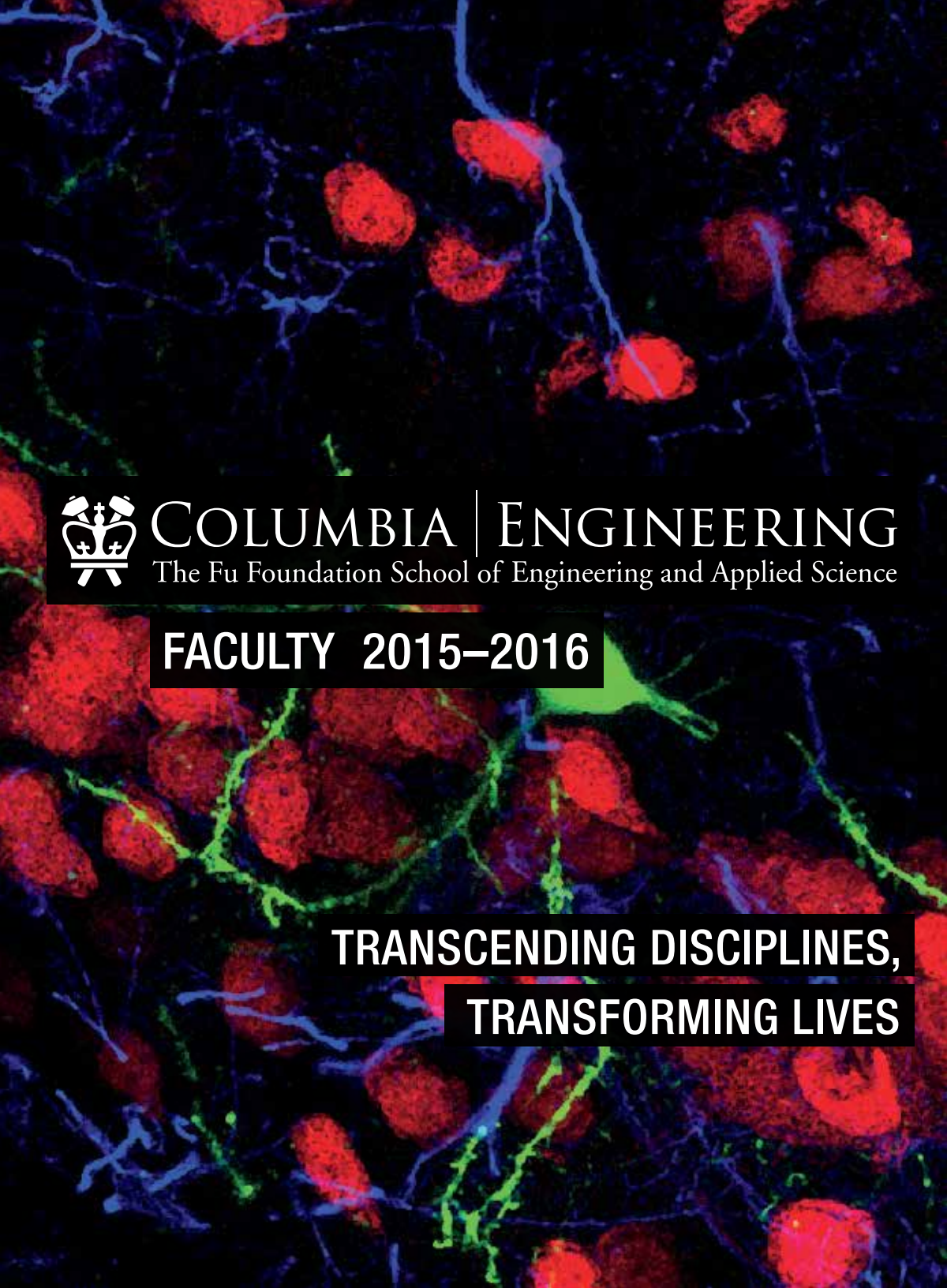
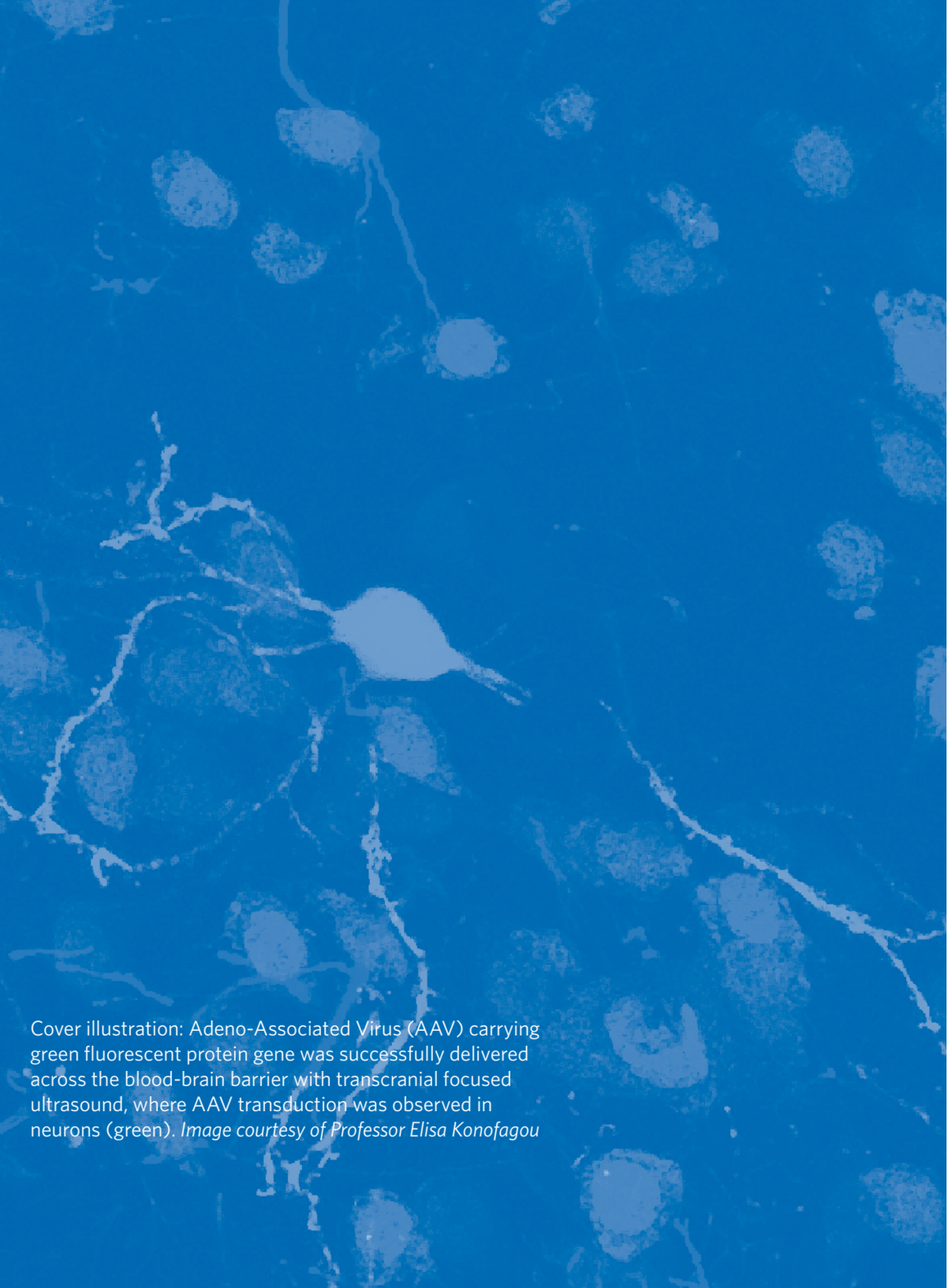


COLUMBIA | ENGINEERING
The Fu Foundation School of Engineering and Applied Science

FACULTY 2015–2016

TRANSCENDING DISCIPLINES, TRANSFORMING LIVES



Cover illustration: Adeno-Associated Virus (AAV) carrying green fluorescent protein gene was successfully delivered across the blood-brain barrier with transcranial focused ultrasound, where AAV transduction was observed in neurons (green). *Image courtesy of Professor Elisa Konofagou*

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We are in the midst of an Engineering Renaissance, and nowhere is that more apparent than at Columbia Engineering. I am pleased to be able to share with you the work of our faculty as we pursue our mission of transcending disciplines and transforming lives, while educating the next generation of engineering and applied science leaders who are enriched with the intellectual resources of a global university.

Today, Columbia Engineering faculty continue a path-breaking tradition of innovation and impact through interdisciplinary research initiatives that could not have been imagined when our School was founded more than 150 years ago. Our faculty are at the hub of the University's cross-disciplinary efforts, including the Data Science Institute, Earth Institute, Zuckerman Mind Brain Behavior Institute, Precision Medicine Initiative, Columbia Nano Initiative, Columbia Entrepreneurship, and Global Columbia. Our ability to collaborate with other faculties within Columbia has resulted in incredible research discoveries that cross traditional disciplinary boundaries.

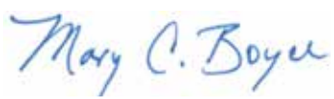
Columbia research has created novel devices, technologies, and methodologies that make a difference in human lives. We are at the forefront of finding cost-effective methods of decoding the human genome, diagnosing diseases using labs-on-a-chip, and growing new bone and muscle tissue.

We are recognized worldwide for pioneering nanoscience and nanoengineering. Manipulating materials at the atomic and molecular levels is providing new ways to fabricate macroscale products that will impact medicine, energy, water, computing, and much more.

Columbia research also focuses on macroscale engineering, attacking global issues as diverse as urban infrastructure, climate modeling, and water—from resourcing to sanitation to breakthrough technologies for clean water, to decentralized energy grids and technology—in the developing and developed world.

At the same time, our pandisciplinary approach to the theory and practice of data science is revolutionizing the pace, the scale, and the pattern of discovery, invention, innovation, and entrepreneurship. Led by our faculty and including the faculties of eight of our sister Schools, the Data Science Institute is building foundational science and engineering while also advancing breakthroughs in health care, urban infrastructure, new media, financial analytics, materials discovery, and cybersecurity.

Within these pages you will find an overview of the diverse research interests of the creative, entrepreneurial faculty of Columbia Engineering, whose discoveries and innovations are, indeed, transcending disciplines and transforming lives.



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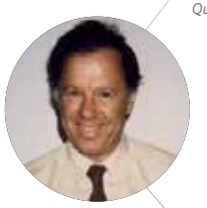
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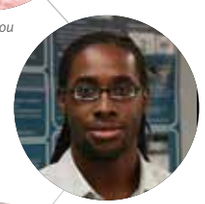
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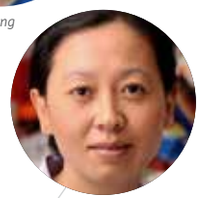
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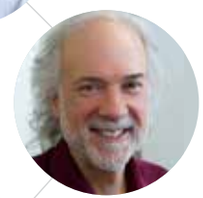
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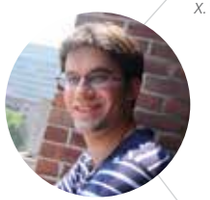
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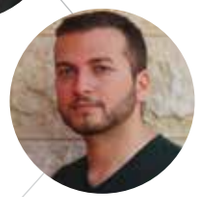
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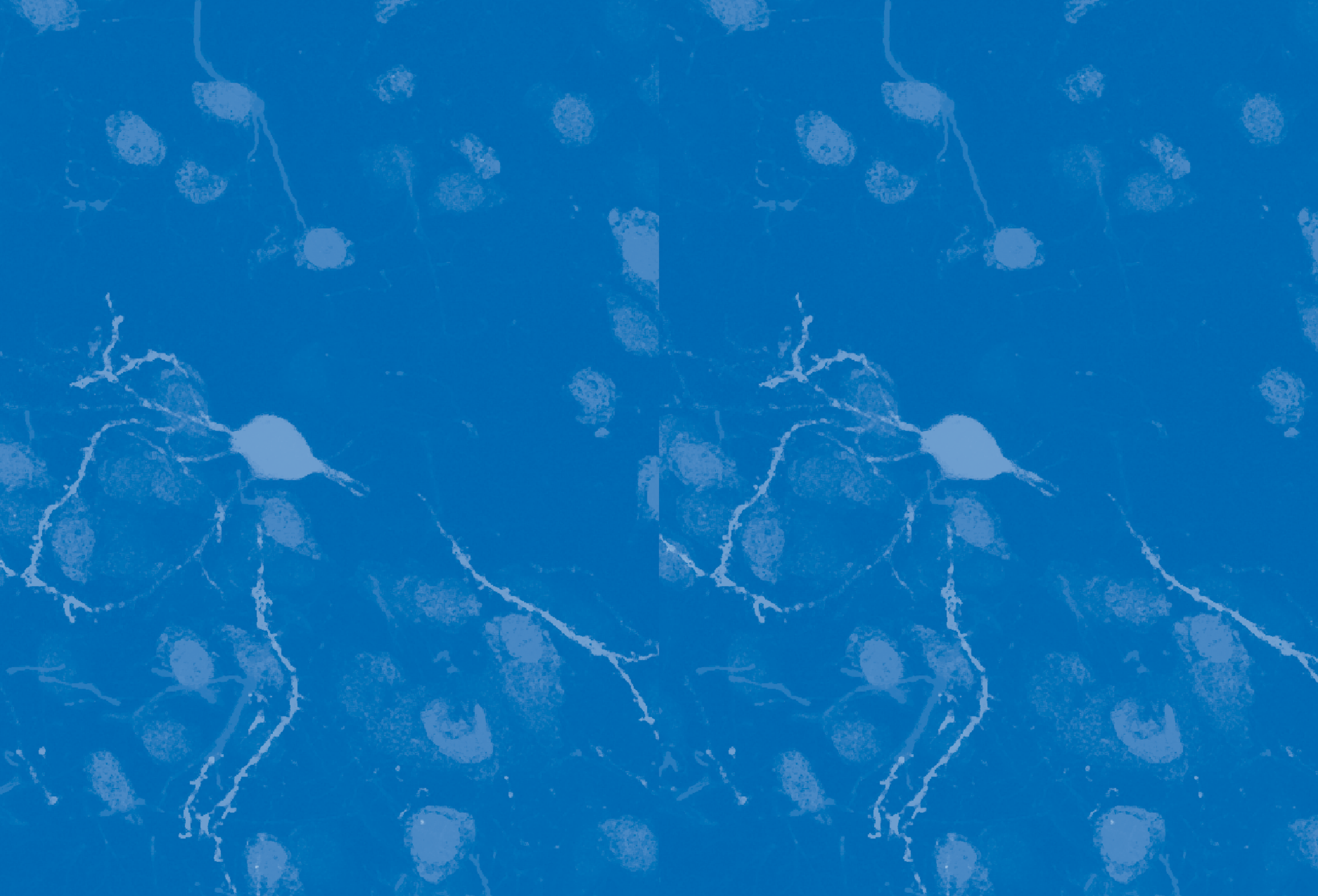

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