

Patrons of Physics Fellows Society

The personal stories of graduate fellowship recipients were shared at the Society's annual dinner.

by Danielle Forde

Eleanor Richard is a first-year graduate student and recipient of a Frank Fellowship

Thank you very much for your kind and generous sponsoring of my fellowship. I am extremely grateful for the opportunity to attend MIT without financial concern during my first year. Your support has allowed me to immerse myself in a research group whose work truly excites me, without the distraction of funding uncertainty.

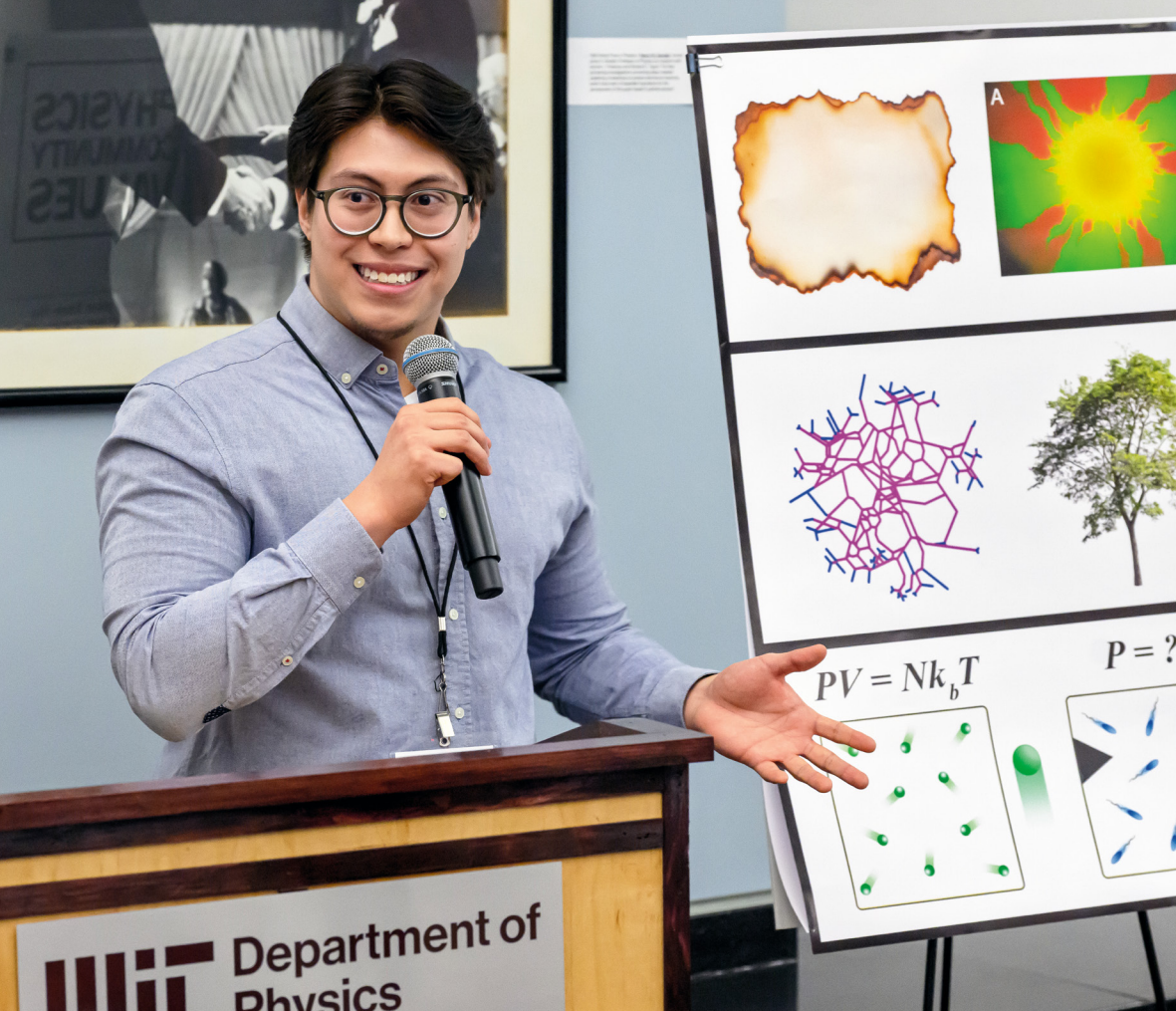
I have joined the condensed matter experiment division, where I study the out-of-equilibrium properties of two-dimensional materials using ultrafast electron diffraction. In our experiments, we excite materials with light and track their lattice and charge dynamics by recording electron diffraction patterns as a function of time. This approach allows us to probe how materials respond on ultrafast timescales and move toward controlling material properties on demand. I believe this capability will be essential for accessing and stabilizing phases of matter that have not yet been

observed experimentally. As an undergraduate at Cornell University, I also studied out-of-equilibrium material properties using complementary techniques such as terahertz spectroscopy, which is sensitive to low-energy excitations. I am excited to continue building on this foundation during my PhD and to contribute to our understanding of how we can control materials with light.

The flexibility provided by my fellowship has also allowed me to be involved more broadly in the MIT community. I joined the Physics Graduate Students Advising Graduate Admissions organization where I mentored two senior undergraduate students applying to physics PhD programs. I really enjoyed meeting other passionate students and sharing insights from my own graduate

Eleanor Richard,
Frank Fellow.
Credit: Justin Knight
Photography.





Sergio Eraso, Thomas Fellow. Credit: Justin Knight Photography.

application process. Outside of academics, I joined the MIT triathlon team and have loved exploring the beautiful Boston area through running and biking!

Thank you again for your generosity and support. This fellowship has made my first year at MIT truly exceptional. I am grateful for all that I have learned so far and am excited for the opportunities that lie ahead!

Sergio Eraso is a third-year graduate student and recipient of a Thomas Fellowship

I am writing this to express my gratitude for your generous support in enabling me to pursue my PhD in Physics at MIT. When I was seven, I immigrated to the United States with my mom, leaving behind familiar life in

Colombia. We spent the next decade moving between various different neighborhoods and schools in the search of better opportunities. Each time we moved, the classrooms, teachers, and classmates changed, but the symbols written on the board stayed mostly the same. Math became a constant anchor in my education, something that transcended school systems and countries. From a young age, I enjoyed the puzzles math provided and learned to take ownership of my education as a result of the instability of switching schools so often. I spent much of my free time reading textbooks and watching YouTube videos on math and science. By the time I got to college, I supplemented all of my classes with the MIT OpenCourseWare versions. I used to joke that at least a third

of my undergraduate degree came from MIT long before I received my acceptance letter.

Now, as a PhD student at MIT, I have the privilege of studying a wide range of questions at the interface of physics and biology. Currently, I am studying the collective behavior of active matter, self-propelling particles such as bacteria or molecular motors, that do not obey many laws in the established physics canon. Better understanding of these systems can provide insight into how biological systems self-aggregate into cohesive structures. Thanks to your generous support, I have also been able to submit two manuscripts for publication in my PhD: one on computational immunology studying how our body repartitions energy upon infection, and the other on

Thomas Barbera,
Whiteman Fellow.
Credit: Justin Knight
Photography.



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evolutionary dynamics and connections to well-known results in the field of nonequilibrium statistical physics. Your aid has greatly facilitated my contributions to these two drastically different fields.

Beyond research at MIT, I am also passionate about mentorship and outreach. I have spent much of my free time tutoring students in our Physics Department and providing support to students applying to graduate school from underrepresented backgrounds. Your investment not only represents hope in students like me, but it extends to the students that I serve as well, whose paths to places like MIT were not always straightforward. I am sincerely thankful for your generosity and for the role you have played in making my education possible.

Thomas Barbera is a first-year graduate fellow and recipient of a Whiteman Fellowship

I have always had a passion for learning. Math was my first love; for something that seemed simple at first glance, there was so much complexity under the surface. It harnesses the ability to describe everything. But I found myself desiring a more tangible career; something more concrete, where I could point to a discovery or invention and say “We found it.” However, growing up in a single-parent household with a mother who works in education and two older siblings, I was not in a very privileged financial position. I was hard-pressed to find opportunities to gain research experience in high school, and was blessed to earn merit

scholarships to cover my undergraduate studies at the University of Notre Dame.

I began my college career as a chemistry major, as it seemed to me that chemistry was the most tangible science. In my second semester, I remember sitting in an organic chemistry lecture, following complex reaction mechanisms across the board, when it occurred to me that there was something more to all of this; a hidden structure beneath the web of arrows and bonds. I began to notice patterns, hints of a deeper logic beneath the molecules themselves. And I realized I wasn’t just fascinated by how reactions occurred; I was drawn to the underlying rules—the invisible framework that governed all matter. At that moment, I became fascinated by the power

of physics to explain the universe at every level, starting from the smallest fundamental particles and building to entire galaxies. Physics is the foundation for the world of science; it is where our understanding of the universe begins and ends. After that semester, I switched my major to physics and never looked back.

It was a dream come true to be accepted to the PhD program at MIT. As a Massachusetts native, I always dreamed of returning home for my career. MIT was the school I visited every summer, walked around campus, and said "This is where I want to be." So, when I opened that acceptance letter sitting on my floor, expecting nothing but disappointment, it hit me—everything I spent 22 years

working for had finally come to fruition.

Throughout my first year at MIT, I have worked with Prof. Brooke Russell on a variety of fundamental particle physics projects surrounding dark matter detection and the properties of neutrinos. Currently, I am actively probing several unverified predictions related to both. For neutrinos, I contribute to hardware and simulation efforts for the Deep Underground Neutrino Experiment (DUNE) Near and Far Detector systems, which aim to measure neutrino flavor oscillations and explore potential differences between neutrinos and antineutrinos. I am also heavily involved in a novel dark matter direct detection experiment at the

Kamioka Cryolab in Japan, where I spent this past summer building and installing readout electronics to commission a cryogenic refrigerator that I will use to detect nuclear recoils in superfluid helium—possible signatures of low-mass dark matter interactions.

All of my success would not have been possible without your kindness and generosity. I have been able to fulfill a lifelong dream of studying at MIT, and can continue to strengthen my understanding of physics over the next several years. I want to thank you both, from the bottom of my heart, for the opportunity you have given me to be here. I look forward to the years ahead, where I can grow as a student, physicist, and individual. Truly, thank you.

Support the MIT Department of Physics

The MIT Department of Physics strives to be at the forefront in every field where new physics can be found. By constantly pushing the limits, we have a chance to observe new general principles and to test theories of the structure and behavior of matter and energy.

We invite you to join us on this journey with your financial support. Please consider a gift on behalf of the MIT Department of Physics. As important as outright gifts are to the Department, deferred gifts and other tax planning approaches can often make a more substantial gift possible. Gifts in any amount to the Physics Department unrestricted fund provide the discretionary funds necessary to start new experiments and new science.

Attracting the best graduate students to work with our faculty continues to be our highest priority. We have established the Patrons of Physics Fellows Society to recognize friends of the Department who have made it possible for us to recruit the very best graduate students. A commitment of \$70,000 or higher will make you a member of this society. You

will receive updates from the named graduate student you are supporting and be invited to the annual Patrons of Physics Fellows Society dinner.

With your help, we will continue to understand the deepest aspects of nature, perhaps even the origins of space, time and matter. To make a gift, or for more information on making a gift, please contact:

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