The Adolph C. and Mary Sprague

Miller Institute

for Basic Research in Science

Newsletter
Spring 2023

Responsible Machine Learning: Threats and Opportunities

Miller Fellow Focus: Michael P. Kim

These days, machine learning is everywhere we look. Machine learning (ML) algorithms are not simply being used as sophisticated calculators, but instead, are increasingly implicated in making consequential decisions in our lives. ML algorithms are tasked with driving our cars, running advertising platforms, and even making medical predictions. Such applications of ML in new domains present exciting opportunities, but also raise serious societal and technical concerns. As a theoretical computer scientist at the Miller Institute, my research asks basic questions about the responsible use of algorithms that make predictions about people. Given an ML algorithm, are its predictions fair to individuals from marginalized groups? Are the predictions robust: do they remain fair and accurate when deployed in non-ideal conditions? And on what basis should we trust the output of an ML algorithm to be valid? Rather than addressing these questions on an algorithm-by-algorithm basis, my research program takes a more foundational approach. My work formalizes concerns about ML algorithms into concrete definitions — in the language of computer science, math, and statistics — so that we can reason precisely about the issues at hand. Coming up with the "right" definitions is often the hardest part of my job: we must balance a desire for general-purpose solution concepts (that can be applied broadly within ML) with an awareness for the context

in which the definitions will be applied (so that the definitions are actually effective). Ultimately, studying these definitions clarifies what we can and cannot expect from ML algorithms.

During my PhD, my research initiated the study of a concept called *multicalibration* as a formal notion of fairness in prediction. Consider an ML predictor involved in medical risk prediction. Here, the ML algorithm receives an individual's patient data as input, and spits out an estimated risk of a certain health outcome, say, probability of heart attack in next 10 years. A key concern in the study of fair prediction arises due to predictions that are miscalibrated across groups. Intuitively, *calibration* requires that predictions "mean what they say"; that is, averaged over the individual patients who re-

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Visiting Miller Professorship Departmental Nominations
Deadline: September 8, 2023

Miller Research Fellowship Nominations
Deadline: September 13, 2023

Miller Research Professorship Applications
Deadline: September 18, 2023

"My projects benefited enormously from the Miller Professorship. By being able to commit myself fully to research during my Professorship, I was able to work with my students and postdocs to bring these projects to the next level. The Miller Tuesday lunches were also a major factor in initiating a new collaboration with Miller Professor David Drubin for biological research. The resulting work is likely to bring about many discoveries in structural microbiology."

- Holger Mueller
Miller Professor 2020-2021, Physics

Call for Visiting Miller Professor Nominations

Online Nomination Deadline: September 8, 2023

Visiting Miller Research Professorship AY 2024-2025

The Advisory Board of the Miller Institute for Basic Research in Science invites UC Berkeley faculty to submit online departmental nominations for Visiting Miller Research Professorships and the Gabor A. and Judith K. Somorjai Visiting Miller Professorship Award for terms in Fall 2024 or Spring 2025. The purpose of these Visiting Miller Professorships is to bring promising or eminent scientists to the Berkeley campus on a short-term basis for collaborative research interactions. It is required that awardees be in residence at Berkeley during their appointment term. Faculty members or research scientists from around the world are eligible to be considered for sponsorship. Non-US citizens must be eligible for J-1 Scholar visa status in order to be awarded. Faculty members at other UC campuses are eligible to be nominated for this program as well. The Miller Institute, as the sponsor and administrative department, will extend an invitation after advising the department of its selection.

Beginning in May 2023, nominations will be accepted from UC Berkeley faculty for Visiting Professorship candidates for the 2024-2025 academic year. Nominations are judged competitively and are due by September 8, 2023. It is anticipated that between four and ten awards will be made.

For more information, and to access the nomination form online, visit miller.berkeley.edu/visiting-professorship.

Call for Miller Professor Applications

Online Application Deadline: September 18, 2023

Miller Research Professorship AY 2024-2025

The Miller Professorship program looks forward to announcing the call for applications for upcoming terms in the academic year 2024-2025. The objective of the Miller Professorship program is to provide opportunities for faculty to pursue new research directions on the Berkeley campus and to participate in the vibrant Miller Institute interdisciplinary scientific community. Appointees are encouraged to follow promising leads that may develop in the course of their research. In order to accommodate a range of faculty members, the Miller Professorship program offers appointees, in consultation with their Departmental Chair, the option of taking teaching relief or continuing to teach during their Miller Professorship term. Funds will be distributed differently depending upon the choice selected.

The primary evaluation criteria will continue to be research excellence. Proposals to write books are not viewed as competitive. Applicants are also encouraged to describe their interest in participating in the Miller Institute community and providing mentorship to the Miller Research Fellows.

Beginning in May 2023, applications will be accepted from UC Berkeley faculty for terms in the 2024-2025 academic year. Applications are judged competitively and are due by September 18, 2023. It is anticipated that between four and ten awards will be made.

For more information, and to access the application online, visit miller.berkeley.edu/professorship.

:: **Nomination & Application details**: miller.berkeley.edu

:: **Questions?** millerinstitute@berkeley.edu

Call for Nominations: Miller Research Fellowship

2024-2027 Term

Nomination Deadline: September 13, 2023

The Miller Institute for Basic Research in Science invites department chairs, faculty advisors, professors and research scientists at institutions around the world to submit nominations for Miller Research Fellowships in the basic sciences. Through this program, the Miller Institute seeks to discover and encourage individuals of outstanding talent, and to provide them with the opportunity to pursue their research on the Berkeley campus. Fellows are selected on the basis of their academic achievement and the promise of their scientific research. Miller Fellows also have a keen curiosity about all science and share an appreciation for an interdisciplinary experience. The Miller Institute is the administrative home department for each Miller Fellow who is hosted by an academic department on the Berkeley campus. A list of current and former Miller Research Fellows can be found at: https://miller.berkeley.edu/fellowship/members/all-mf-by-name.

The Miller Institute also welcomes nominations for the Kathryn A. Day Miller Postdoctoral Fellowship award for the 2024-2027 Fellowship cohort. Named in honor of the Institute's retired Chief Administrative Officer Kathy Day, this award is intended for an early career scientist who, in addition to excelling in their pursuit of basic science research, also engages in outreach in support of science.

Miller Research Fellowships are intended for exceptional young scientists of great promise who have recently been awarded, or who are about to be awarded, the doctoral degree. Miller Fellows are expected to begin their Fellowship shortly after being awarded their Ph.D. A short period as a postdoctoral fellow elsewhere does not exclude eligibility, but applicants who have already completed more than two years of postdoctoral experience are not eligible for nomination. **A nominee cannot hold a paid or unpaid position on the Berkeley campus at the time of nomination or throughout the competition and award cycle which may last through the end of February 2024.** Nominees who are non-US citizens must show eligibility for obtaining J-1 Scholar visa status for the duration of the Miller Fellowship. Non-US citizens will be required to prove English language proficiency prior to award. The Miller Institute does not support H1B visa status. Eligible nominees will be invited by email by the Institute to apply for the Fellowship after the nomination has been reviewed. Direct applications and self-nominations are not accepted. All nominations must be submitted using the online nomination system at: **miller.berkeley.edu/fellowship.**

Nominators will need the following required information to complete the online nomination process:

- Nominee's complete full and legal name (do not use nicknames)
- Nominee's current institution
- Nominee's complete, current and active E-mail address that will be valid through March 2024, and current mailing address with postal code and telephone number
- Nominee's Ph.D. Institution and (expected) Date of Ph.D. (month & year required)
- Letter of recommendation and judgment of nominee's promise by the nominator (saved in PDF format). Letter must be specific to the Miller Fellowship, have a current date, and be on institutional letterhead. The Executive Committee finds it helpful in the recommendation letter to have the candidate compared with others at a similar stage in their development
- Nominator's current active E-mail address, title, and professional mailing address (include zip code/campus mail code)

The Institute provides a stipend of $75,000 with annual increases and an annual research fund of $10,000, for total initial compensation of $85,000. There is provision for travel to Berkeley for incoming Miller Fellows and their immediate families and a maximum allowance of $3,000 for moving personal belongings. Benefits, including medical, dental, vision and life insurance are provided with a modest contribution from the Miller Fellow. All University of California postdocs are represented by the UAW. Fellowships are awarded for three years, generally beginning August 1, 2024 and ending July 31, 2027. Approximately eight to ten Fellowships are awarded each year. Candidates will be notified of the results of the competition starting in mid-December, and a general announcement of the awards will be made in the spring.

We are grateful for your thoughtful participation in this process and the contribution you are making in the careers of distinguished early-career researchers.

:: **Nomination & Application details**: miller.berkeley.edu

:: **Questions?** millerinstitute@berkeley.edu

Miller Research Fellowship Awardees 2023-2026

The Miller Institute is pleased to introduce the 2023-2026 Miller Research Fellows. Each year, the Miller Research Fellowship program seeks to discover individuals of outstanding talent and to bring young scholars of great promise to the Berkeley campus. The Fellows will be working with Berkeley faculty hosts for a three-year term beginning in the 2023 academic year. A full list of all past and present Miller Fellows is available on our website.

ANNOUNCING THE KATHRYN A. DAY MILLER POSTDOCTORAL FELLOW!

This year, the Institute named incoming 2023-2026 Fellow Molly McFadden as the Kathryn A. Day Miller Postdoctoral Fellow! This award was established in 2019 through a major pledge to the Institute by Professor Randy Schekman and Professor Sabeeha Merchant in honor of Kathy's dedicated service to the Institute over a 30-year career. In addition to demonstrating great promise in research, Molly was chosen for her work in outreach and communication in science. We're thrilled to welcome Molly and celebrate Kathy's legacy at the Institute through this special Fellowship award!

Molly McFadden

Kathryn A. Day Award

Ph.D. - Caltech
Undergraduate Institution: Indiana University, Bloomington
Berkeley Dept. - Chemistry
Faculty Hosts: John Hartwig

Reuse and recycling of polyethylene is vitally necessary, but current strategies are prohibitively expensive and paradoxically entangle deterioration of materials' properties with the processes intended to increase their value. A key factor in solving this problem lies in fundamental mechanistic investigations and catalyst design. As a Miller fellow, I will conduct research to reduce the world's most abundant plastic waste by converting it to more valuable, useful products via catalytic C–H functionalization of the polymer backbone, thereby incentivizing commercial efforts for plastic waste collection, sorting, and recycling.

Olatubosun Fasipe

Ph.D. - University of Benin, Nigeria
Undergraduate Institution: Federal University of Technology Akure, Nigeria
Berkeley Dept. - Civil and Environmental Engineering
Faculty Host: Evan Variano

My research of over a decade have been involved in quantifying energy needs with a view of establishing baseline for energy use or need sustainably. My Doctoral study scientifically developed and applied an optimization model named Small Hydropower Resource Assessment and Sustainability Analysis. This research provides valid hydrological data and template in a data-scarce region while defining pathways for Nigeria's Energy Transition and strengthening the implementation of Sustainable Development Goals 7 and 13 in Nigeria. At UC Berkeley I hope to expand my experiences, research interests, and potential contributions to academia as my research will focus on transforming combine value judgment preferences using Multicriteria Decision Analysis Model and Geographic Information System to critically appraise Small Hydropower sites for beneficial energy capture in hydrological basin, thereby accelerating energy access.

Augusto Ghiotto

Ph.D. - Columbia University
Undergraduate Institution: Columbia University
Berkeley Dept. - Physics
Faculty Host: James Analytis

During my doctoral studies, I used moiré engineering of two dimensional materials to uncover novel correlated electronic phases. As a Miller fellow, I plan to combine the chemical design of novel quantum materials with the versatility of two dimensional devices to further probe correlated electrons.

Ioannis Kipouros

Ph.D. - Stanford University
Undergraduate Institution: Middlebury College
Berkeley Dept. - Chemistry
Faculty Host: Michelle Chang

Enzymes that contain transition metals, called metalloenzymes, catalyze some of the most challenging chemical transformations in living organisms. My PhD work focused on understanding how a group of O2-activating metalloenzymes control the geometric and electronic structure of their metal sites to enable their native catalytic functions. As a Miller Fellow, I am interested in employing enzyme discovery and engineering methods to expand the scope of metalloenzymes beyond their native roles and towards performing novel chemical transformations with downstream applications in sustainable chemical synthesis and biocatalysis.

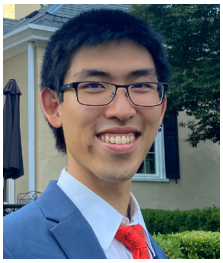
Ethan Lake

Ph.D. - MIT
Undergraduate Institution: University of Utah
Berkeley Dept. - Physics
Faculty Hosts: Ehud Altman & Mike Zaletel

I have broad interests in the theory of quantum matter, with my research to date focused largely on emergent phenomena that occur in systems containing a large number of interacting quantum particles. Sometimes the problems I work on are abstract, such as studying the way in which computational problems can be encoded in certain quantum systems. At other times they are more concrete, such as using hints from experiments to understand how unusual types of superconductors function. In all cases, I am always eager to apply insights from mathematics and theoretical computer science to better inform my work.

Calvin Leung

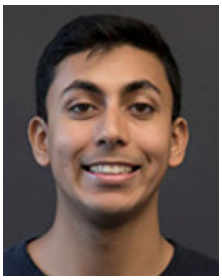
(2024-2027 cohort)



Ph.D. - MIT
Undergraduate Institution: Harvey Mudd College
Berkeley Dept. - Astronomy/Physics
Faculty Hosts: Aaron Parsons, Wenbin Lu & Liang Dai

Two of the broadest questions surrounding extragalactic fast radio bursts are as follows: What are their origins? How can FRBs best be used as probes of cosmology? Progress is difficult because precisely pinpointing these bursts to their hosts is extremely challenging for existing radio telescopes. However, the field is poised for a breakthrough. I am leading the CHIME/FRB Outriggers project: an ambitious campaign to build three unique telescopes which will pinpoint thousands of these mysterious bursts to within their host galaxies using very long baseline interferometry (VLBI). As a Miller Fellow, I aim to commission the third and final CHIME/FRB Outrigger station at the SETI Institute in Hat Creek, California. The completed array will advance FRB science into a new era of plentiful and precise FRB localizations, which will open up a wealth of new opportunities in high-energy astrophysics and cosmology.

Rohil Prasad



Ph.D. - Princeton University
Undergraduate Institution: Harvard
Berkeley Dept. - Mathematics
Faculty Host: Michael Hutchings

My research centers around dynamical systems, which are theoretical models of physical systems evolving over time. I study their structure by developing tools from the mathematical field of symplectic geometry. These tools draw their significance from apparent deep links between dynamics and other fields such as topology and (mathematical) physics and provide avenues for investigation in these areas as well.

James Santangelo

Ph.D. - University of Toronto
Undergraduate Institution: University of Toronto
Berkeley Dept. - Integrative Biology
Faculty Host: Rasmus Nielsen

Approximately 55% of the world's human population live in urban areas, and this figure continues to grow annually. Work by urban evolutionary ecologists continues to highlight the numerous ways that cities are shaping the ecology and evolution of life, but we still lack an understanding of the traits and genes that facilitate survival under the stressful environmental conditions imposed by urbanization. As a Miller Fellow, I am addressing this problem by examining the genomes of urban and rural white clover plants sampled from 26 globally distributed cities with the goal of identifying the genes showing signatures of adaptation to urban environments, and assessing the extent to which these signatures are shared across plants from different cities.

Ewin Tang

Ph.D. - University of Washington
Undergraduate Institution: University of Texas, Austin
Berkeley Dept. - EECS
Faculty Host: Umesh Vazirani

My interests are mainly in quantum information and numerical linear algebra. Broadly, I wish to understand in which domains quantum computers could give significant speedups over classical computers. My past work includes showing that certain classes of "quantum machine learning" algorithms can be simulated with classical algorithms better than previously expected; and giving better algorithms to characterize quantum systems.

Yuhan Yao

Ph.D. - Caltech
Undergraduate Institution: Peking University, China
Berkeley Dept. - Astronomy
Faculty Hosts: Wenbin Lu & Raffaella Margutti

My research focuses on time domain astronomy and high energy astrophysics. I use sky surveys and multi-wavelength observations to study the most energetic transient phenomena in the Universe, such as the explosion of stars, and the extreme environments around compact objects. At UC Berkeley, I aim to combine observations with theory to understand the accretion and jet physics during the tidal disruption of stars by massive black holes. I also hope to use these transients to probe the demography of black holes.

Xueyue (Sherry) Zhang

Ph.D. - Caltech
Undergraduate Institution: Tsinghua University, China
Berkeley Dept. - EECS/Physics
Faculty Host: Alp Sipahigil

My research is part of the rapidly growing field of quantum science and technology, which may offer solutions to challenging problems in both information processing and fundamental sciences. Specifically, I aim to explore novel quantum hardware that may address the limitations of current solid-state quantum platforms and enter uninvestigated regimes in physics research. Previously, I have contributed to system-level innovation by introducing long-range connectivity into superconducting circuit architectures through light-matter interaction. As a Miller Fellow, I will shift my focus to the component level, investigating novel telecom-band quantum emitters in the mature host material of silicon.

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> CONTINUED FROM PAGE 1 [Miller Fellow Focus]

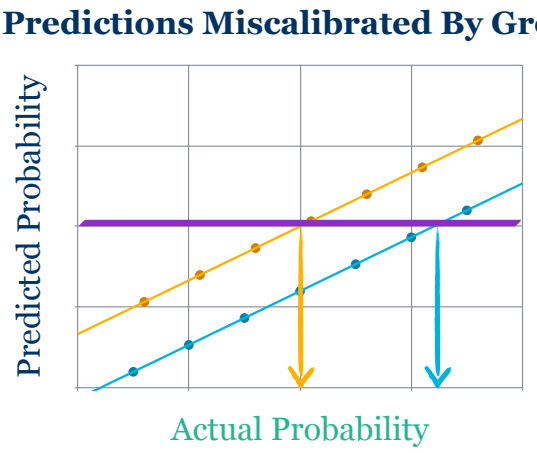

Figure 1: Cartoon of miscalibrated predictions. The same predicted probability corresponds to a different actual probability across groups. Such predictions overlook qualified individuals from the population plotted in blue.

ceive a risk score of 20%, about 20% of them will have a heart attack in the next 10 years. When predictions are not calibrated, the quality of predictions can differ dramatically across groups. For instance, consider the cartoon in **Figure 1**, where we plot two groups of individuals (one in orange, one in blue) based on their predicted risk vs. actual risk. If the predicted risk perfectly tracked the actual risk, then both the orange and blue curves would lie on a single (slope-1) line at the center of the plot. Instead, we see that the blue curve is right-shifted compared to the orange curve, and if we use a fixed threshold to determine triage for patients, we may overlook qualified individuals in the blue population. Far from hypothetical, this cartoon is based off of an empirical study of medical risk predictors, used in hospitals today, that exhibit this form of miscalibration across racial groups.[1] The study shows that, as a consequence of miscalibration, in order to qualify for advanced care, Black patients need to be considerably sicker than their counterpart White patients.

To address the disparate impact exhibited by miscalibrated predictors, my collaborators and I introduced multicalibration as a definition of fairness in ML. Multicalibration takes a comptuational-theoretic perspective towards addressing questions of how to mitigate the effects of miscalibration: multicalibrated predictors must appear calibrated, not simply overall, not simply over traditionally-protected groups (e.g., defined by racial categories), but on every population that can be identified within the data. We formalize this idea of "identifiability" in the language of complexity and learning theory, and show how multicalibration provides signficantly stronger guarantees than historical notions of fairness. Under multicalibration, no meaningful subpopulation can be overlooked by the prediction rule. Importantly, despite the strength of the guarantee, we provide efficient algorithms that provably learn multicalibrated predictors for such identifiable subpopulations. As a Miller Fellow, I have continued my research on fairness in ML and explored applications of multicalibration beyond its original use, to address concerns of robustness in prediction.

1 Obermeyer et al., Science 2019

While the community studying fairness and so-called "responsible" ML has made significant progress in recent years, almost all of the research assumes that we trust the platform running the ML algorithms. But training ML predictors often require significant expertise and computational resources. As such, a common paradigm involves *delegation* of training ML models: a scientist who collects data will contract with an ML-as-a-Service provider, who promises to return the scientist an ML predictor trained to some specification. In such a setting, how can the scientist be sure that the service provider did their job correctly? Can a malicious service provider abuse the trust of the scientist to fool them into using a faulty predictive model?

In recent work with collaborators including my Miller Host, Shafi Goldwasser, I have demonstrated an inherent threat to using an ML predictor trained by an untrusted service provider. We define and construct what we call *undetectable backdoors* for ML predictors. As the name suggests, an undetectable backdoor is defined by two properties. First, the backdoor to the ML model provides a mechanism that the service provider can use to change the input-output behavior of the predictor. That is, for every input, the service provider can make an imperceptible change to form a tweaked input, where the output of the predictor changes in a way it wouldn't naturally. The second property — which is our key contribution — is undetectability: we show how to insert this backdoor mechanism in a manner that is hidden to any observer. Formally, while the honestly-trained and backdoored predictors implement different functionalties, they are *computationally-indistinguishable*. In practical terms, the existence of undetectable backdoors means that whenever you're using an ML predictor that was trained by another party, the predictor may have a backdoor mechanism, and there is no feasible test you can run that would detect it. More technically, we show how to use cryptographic primitives (e.g., digital signature schemes) and computational assumptions (e.g., the worst-case hardness of certain lattice problems) to establish the hardness of detecting our backdoor mechanisms. Under the same assumptions that underly the security of modern cryptography, no polynomial-time observer can distinguish between honestly-trained and backdoored models.

Our work on undetectable backdoors should serve as a cautionary tale. While it's important to characterize the risks and attacks that exist in current frameworks, at the end of the day, my goal is to develop new tools for promoting trust in the machine learning we use. We show how cryptographic tools can pair with ML in ways to create malicious functionality, but somewhat counterintuitively, the same cryptographic tools may help us to secure ML algorithms. In future research, I plan to investigate new paradigms for delegation of ML, building off of existing frameworks for secure delegation of computation, from the cryptography literature. If successful, the tools we develop will allow scientists to delegate training of ML, and obtain predictors that they trust have been trained responsibly.

Michael P. Kim is a third-year Miller Fellow in EECS, hosted by Shafi Goldwasser at the Simons Institute for the Theory of Computing. Before this, Dr. Kim completed his PhD in Computer Science at Stanford University, advised by Omer Reingold. Dr. Kim's research addresses basic questions about the appropriate use of machine learning algorithms that make predictions about people. More generally, Dr. Kim is interested in how the computational lens (i.e., algorithms and complexity theory) can provide insights into emerging societal and scientific challenges.

Contact: mpkim@berkeley.edu

Recent Publications by Miller Members

Manos Mavrikakis (Visiting Miller Professor 2019) is a co-author of the paper "Formation of active sites on transition metals through reaction-driven migration of surface atoms", published in *Science*.

Norman Yao (Miller Fellow 2014-2017) is a co-author of the paper "Probing many-body dynamics in a two-dimensional dipolar spin ensemble", published in *Nature Physics.*

Yi Zhang (Miller Fellow 2021-2024) & **William Boos** (Miller Professor 2021) are the co-authors of the paper "An upper bound for extreme temperatures over midlatitude land", published in *PNAS* and featured in the *Physics Magazine.*

Nayeli A. Rodríguez Briones (Miller Fellow 2020-2023) is a first author of the recent paper "Experimental Activation of Strong Local Passive States with Quantum Information", published in the *Physical Review Letters*.

Chadi Saad-Roy (Miller Fellow 2022-2025) is a co-author of the papers: "Host heterogeneity and epistasis explain punctuated evolution of SARS-CoV-2", published in *PLOS Computational Biology;* "Long-term benefits of nonpharmaceutical interventions for endemic infections are shaped by respiratory pathogen dynamics", published in *PNAS;* "Distributed medium viscosity yields quasi-exponential step-size probability distributions in heterogeneous media", published in the *Journal of The Royal Society of Chemistry.*

Alison Feder (Miller Fellow 2018-2021) is a co-author of the paper "State-dependent evolutionary models reveal modes of solid tumour growth," published in *Nature Ecology & Evolution.*

Yao Yang (Miller Fellow 2021-2024) and **Peidong Yang** (Miller Professor 2009) are co-authors of the paper "Operando studies reveal active Cu nanograins for CO2 electroreduction," published in *Nature*.

Steven Beissinger (Miller Professor 2020-2021) and his team use current and historical bird surveys to reveal how land use change has amplified — and in some cases mitigated — the impacts of climate change on bird populations in Los Angeles and the Central Valley. The study, published in the journal *Science Advances*, presents the latest results from UC Berkeley's Grinnell Resurvey Project**.**

Michael Marletta (Visiting Miller Professor 2000) and his colleagues describe the structure of the enzyme and how it works to help the fungus invade plants in the paper published in the journal *Proceedings of the National Academy of Sciences.*

Andrew Rosen (Miller Fellow 2021-2024) was quoted in an interview with *Matter* on his experiences applying for a tenure-track faculty position.

Professor Peidong Yang, Executive Director Professor Marla Feller, Assistant Professor Megan Martik, Symposium Chair Professor Michael Manga, Professors Mike Boots & Roland Burgmann, Executive Committee member Professor Chung-Pei Ma at the Spring 2023 Miller Fellow Host Appreciation Lunch

IN THE NEWS

Current and former Miller members **elected to the NAS:**
Emily Brodsky (Miller Fellow 2001-2002), **Michael Crandall** (Miller Professor 1996), **Marla Feller** (Miller Fellow 1994-1996, Executive Director 2017-Present), **Robert Kass** (Visiting Miller Professor 2005), **Philip Kim** (Miller Fellow 1999-2001, incoming Visiting Miller Professor 2023), **Jeffrey Long** (Miller Professor 2011, 2021-2022, currect Executive Committee member 2022-Present), **Sir Richard Roberts** (Visiting Miller Professor 1991), **Don Tilley** (Miller Professor 2004-2005), **David Weinberg** (Miller Fellow 1990-1991, Visiting Miller Professor 2022), **Hugh Woodin** (Miller Professor 1997-1998).

Ekta Patel (Miller Fellow 2019-2022) was selected as one of the 24 new Fellows for a prestigious **NASA Hubble Fellowship Program,** which is one of the highlights of NASA's pursuit of excellence in astrophysics.

Venkat Guruswami (Miller Fellow 2001-2002) and **Julius Lucks** (Miller Fellow 2007-2010) were awarded the **2023 John Simon Guggenheim Fellowship.**

Jonathan Bland-Hawthorn (Visiting Miller Professor 2018), **Marla Feller** (Miller Fellow 1994-1996, Executive Director 2017-Present), **Shana Kelley** (Somorjai Visiting Miller Professor 2017), **Dung-Hai Lee** (Miller Professor 1999), **Lakshminarayanan Mahadevan** (Visiting Miller Professor 2006) were **elected as new fellows to the American Academy of Arts & Sciences in 2023**.

Iswar Hariharan (Miller Professor 2019-2020) was honored with the inaugural **L&S Faculty Jessica Blanche Peixotto Award** *"in recognition for his outstanding contributions to teaching."*

The Biden Administration named **Gabor Somorjai** (Miller Professor 1977-1978, Miller Senior Fellow 2009-2014) as one of the two recipients of the **Enrico Fermi Presidential Award** *"for key contributions in molecular studies of surfaces through the use of single crystals, the development of techniques for quantitative determinations of surface structure, and establishing the molecular foundations of heterogeneous metal catalysis."*

Susan Marqusee (Miller Professor 2016-2017, Miller Senior Fellow 2019-Present) was named a **2023 American Society for Biochemistry and Molecular Biology Fellow** for *"outstanding contributions to the field through their research, teaching, mentoring or other forms of service."*

Executive Committee member Professor Jeffrey Long, Professors Bryan McCloskey, Kranthi Mandadapu and Joel Moore at the Spring 2023 Miller Fellow Host Appreciation Lunch

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Miller Institute News - Spring 2023
Please send address corrections to:
miller_adm@berkeley.edu

ANNUAL SPRING DINNER 2023

Executive Committee member Chung-Pei Ma, Executive Director Marla Feller and Executive Committee member Yun Song

Miller Fellow Veronika Sunko, guest Petar Petrov, Miller Fellows Michael Celentano, Antoine Koehl and Raul Ramos

Former Miller Fellows Allie Gaudinier and Qiong Zhang, Executive Committee member Chung-Pei Ma, guest Alan Sachs and Senior Miller Fellow Susan Marqusee

Miller Fellows Vayu Maini Rekdal, Dimitrios Fraggedakis and Nayeli A. Rodríguez Briones