Department of Chemical Engineering

Overview

During the academic year 2022–2023, the Department of Chemical Engineering continued its long tradition of global leadership in the discipline. For the 32nd consecutive year, our undergraduate and graduate programs were each ranked #1 by *US News and World Report*. The Department was also ranked #1 in the QS World University Rankings for Chemical Engineering for the ninth straight year. The Department continues to support and invest in its students, staff, and faculty to maintain our position in the face of increasing competition both globally and domestically.

We continued several efforts related to Diversity, Equity, and Inclusion (DEI). Our DEI Committee (DEIC) remains actively engaged, as does our flagship graduate student DEI program, ChAMPS, which mentors students throughout our graduate program's application process. The ACCESS program, first launched in 2009, returned to campus in Fall 2022 after a one-year hiatus in 2021 due to an overwhelming level of participation in the virtual offering in the Fall of 2020. Fall 2022 also saw the return of the Department's Rising Stars in Chemical Engineering Workshop to campus; we celebrated the fifth year of this program for senior graduate and postdoctoral women pursuing careers in academia. The results of these efforts and other outreach mechanisms were evident in the composition of the first-year graduate student class who entered in Fall 2022: 50% women and 10% underrepresented students (from the domestic pool). Our recruiting efforts in Spring 2023 will produce a class of similar composition for the upcoming academic year.

The department concluded its comprehensive strategic planning process, during which a new vision statement emerged, while our existing mission statement was reaffirmed. Four areas were identified as focal points: undergraduate experiential learning, graduate and postdoctoral education, community building and renewal, and research frontiers. Subcommittees in each area were composed of faculty, lecturers, and administrative staff, with each also including at least one member from the Diversity, Equity, and Inclusion Committee (DEIC)which includes students, postdocs, and administrative staff. Representatives from each of the constituencies in the department were included in the planning exercise. In each of the four areas, goal statements were developed and the subcommittees identified specific objectives and strategies for achieving the stated goals. This strategic plan will guide future efforts and initiatives. The department also completed a major renovation on the second floor, resulting in redesigned spaces for first-year graduate students and new lounges for DICE (Diversity in Chemical Engineering) and our undergraduates.

The department continues to attract significant research funding with a 2023 Fiscal Year volume of $64.1 million. Of these funds, $33.5 million are handled directly through the department; the rest are managed by various other cost centers at MIT. The faculty continue to secure healthy funding for their research programs, while participating in the creation and direction of larger multi-investigator projects. Chemical Engineering faculty also continue to lead large, multi-institutional research centers (see Research Centers below).

Professor Paula T. Hammond completed her 8th year as Department Head. Professor Kristala Prather concluded her term of service as Executive Officer after three and a half years; Professor Brad Olsen will take on the role of Executive Officer as of July 2023. Professor Patrick Doyle completed his last year of service as the Graduate Officer, and this role will be taken on by Professor Hadley Sikes as of August 2023. Tom Kinney began his first year as the Undergraduate Officer. Professor Bill Green completed his eighth year as a Postdoctoral Officer, and Professor Martin Bazant completed his third as the Digital Learning Officer. Professor T. Alan Hatton continued as the Director of the David H. Koch School of Chemical Engineering Practice. Professor Robert Armstrong retired from the Department and as the Director of the MIT Energy Initiative in July 2023.

Research and Recognition

Dan Anderson received the 2023 Wilhelm Exner Medal. Martin Bazant was elected to the 2023 Class of ECS Fellows. Richard Braatz received the John R. Ragazzini Education Award. Fikile Brushett won the Electrochemical Society's Charles W. Tobias Young Investigator Award. Arup Chakraborty won the APS Max Delbruck Prize in Biological Physics. Connor Coley earned MIT's Common Ground Award for Excellence in Teaching and a Schmidt Futures AI2050 Early Career Fellows Award. Brandon DeKosky received the 2023 Amgen Young Investigator Award and 2022 James S. Huston Antibody Science Talent Award. Ariel Furst won a Camille Dreyfus Teacher-Scholar Award, an Army Research Office Early Career Award and the 2023 AAAS Marion Milligan Mason Award. Katie Galloway won the BMES Cellular and Molecular Bioengineering Award. Paula Hammond won the MIT Killian Award for 2023-2024. Klavs Jensen won the ISCRE Neal R. Amundson Award and was elected to the NAI. Heather Kulik has received the AIChE CoMSEF (Computational and Molecular Simulation and Engineering Forum) Impact Award. Robert Langer earned the 2022 Balzan Prize. Yuriy Roman won the 2024 Paul H. Emmitt Award in Fundamental Catalysis. Greg Stephanopoulos was elected to the NAS. Will Tisdale won the MIT 2023 Bose Award for Excellence in Teaching.

A few exciting examples of research in the department included efforts by the Anderson Lab to gene edit lungs using nanoparticles, while the Langer Lab helped to develop microparticles to prevent vitamin A deficiency. The Olsen Lab worked to discover biodegradable polyesters and the Brushett Lab modeled flow batteries for grid-scale energy storage. The Strano Lab's nondestructive nanosensors could have wide applications in agricultural science; his lab also discovered simple microparticles can generate an oscillating electrical current that could power micro-robotic devices. The Kulik Lab used computational modeling to design "ultrastable" materials. The Hammond and Olsen Labs worked together to develop a two-component system that could offer a new way to halt internal bleeding. The Doyle Lab developed hydrogels to deliver lifesaving biologics.

New Arrivals, Retirements and Promotions

In Fiscal Year 2023, Brandon DeKosky was promoted from Assistant Professor to Associate Professor without Tenure, Professors Hadley Sikes and William Tisdale were promoted to Full Professor. Professor Robert Armstrong retired after fifty years of exceptional service to MIT.

The Department welcomed nine new staff members. Timothy Elizabeth Xavier joined from Chemistry as Assistant to the Executive Officer. Sean Vo joined from Morgan and Morgan as a Financial Assistant. Suela Caushi joined from Department of Architecture as a Financial Administrator. Munire (Aylin) Temeloglu joined from Dynamic Computers as a Faculty Assistant. Naomh Fairweather joined from CareDash as a Faculty Assistant. Denise Scott joined from Smithsonian Astrophysical Observatory as a Financial Administrator. Shibani Joshi joined from Mechanical Engineering as a Financial Coordinator. Osama Joseph-Irabor joined from Mass General Hospital as an Administrative Assistant, and Jalé Okay joined from Tufts School of Engineering as the Senior Leadership Giving Officer. We also note three internal staff promotions. Rahel Arega was promoted to Financial Coordinator. Adrienne Bruno was promoted from Assistant to the Executive Officer to Undergraduate Academic Coordinator, and Prossy Najuma was promoted to Senior Financial Coordinator.

Undergraduate Education

The Department of Chemical Engineering offers Bachelor of Science (SB) degrees in both Chemical Engineering (Course 10), Chemical-Biological Engineering (Course 10-B), and a flexible SB degree in Engineering (Course 10-ENG). The 10-ENG program leading to the engineering SB degree has concentrations including Biomedical, Energy, Environmental, Materials Process and Design, Society, Engineering, and Ethics, Computation, Manufacturing Design, and Process Data Analytics. Thirty-nine SB degrees were conferred in February and June 2023, 72% awarded to women. The distribution of undergraduate students by class over the last ten years is shown in Table 1.

Undergraduate Enrollment over the Last 5 Years

Class Year	18-19	19-20	20-21	21-22	22-23
Sophomores	41	42	36	38	34
Juniors	37	44	41	52	50
Seniors	59	42	42	39	41
Total	**137**	**128**	**119**	**129**	**125**

The Department advises students about careers for chemical engineers through Discovery and Exploration subjects, First-year Advising Seminars, fall and spring term open houses, Campus Preview Weekend in the spring and Family Weekend in the fall. The Department also offers outreach and extra-curricular activities, such as Department-wide undergraduate project-lab presentations and prizes, ChemE Research Day, Science Slam, undergraduate chemical engineering career seminars with faculty and undergraduate alumni, social events with faculty, and monthly lunches hosted by our AIChE student group. The Department also co-sponsors the ChemE Cube competition team at the AIChE Student Conference each fall.

The senior survey indicates that for 2023, 27% of our students are going on to graduate or professional school, and others have internships or employment in industries such as Consulting, Pharmaceutical Development, and Oil and Gas. At least one 2023 graduate has a startup in the field of Artificial Intelligence.

Undergraduates in the Department of Chemical Engineering maintain an active student chapter of the American Institute of Chemical Engineers (AIChE), with invited speakers, presentations at national meetings, and visits to company sites. The student officers of AIChE were Julia Van Cleef, Tatum Wilhelm, Yijun Yang, Ezra Gordon, Duha Syar, Victoria Yang, Alfonso Restrepo, Fiona Shortt, Khiem Nguyen, Annlin Su, Megan Eaton, Adeena Khan, Austin Chin, Seraphin Castelino, Binette Wadda, Smah Riki, Freya Edholm, and Katie Bailey.

Graduate Education

The graduate program in the Department of Chemical Engineering offers Master of Science degrees in Chemical Engineering (MS) and in chemical engineering practice (MSCEP), the Doctor of Philosophy (PhD) and Doctor of Science (ScD) degrees in chemical engineering, and the Doctor of Philosophy degree in chemical engineering practice (PhDCEP). The PhDCEP track was established in 2000 in collaboration with the Sloan School. The total graduate student enrollment is currently 227, with 217 in the doctoral program and 10 master's level degree candidates. In the doctoral program, 208 students are in the PhD/ScD track and nine are in the PhDCEP track. In the master's level program, 12 are in the MSCEP track. Thirty-eight percent of our graduate students are women, 8% are underrepresented minority students. Forty of our graduate students were recipients of outside fellowship awards, including those from NSF, NIH, DOD and others. The distribution of graduate students by degree for the last ten years is shown in Table 2. During the 2022–2023 academic year, 30 doctoral degrees (PhD or ScD, PhDCEP) were awarded, along with 26 master's level degrees (MSCEP, MS) for a total of 56 advanced degrees conferred.

The Department received 509 applications for admission to the doctoral program, offered admission to 57 individuals, and received 46 acceptances of offers, for an acceptance percentage of 81 percent. Out of 107 applications for master's level degrees, the Department made 14 offers and received 13 acceptances of offers, for a yield of 93 percent. Among the incoming graduate class for 2023, 30 are women and 4 are underrepresented minorities.

Graduate Enrollment over the Last 5 Years

Degree Level	18-19	19-20	20-21	21-22	22-23
Master's	13	14	11	14	10
Doctoral	224	197	213	199	217
Total	**237**	**211**	**224**	**213**	**227**

Research Centers

The Department of Chemical Engineering is actively involved and takes a leadership role in several Institute-wide education and research programs. A few of these are highlighted here. As faculty research officer, Prof. Braatz facilitated the continuous updating and evolution of the Department's strategic plan and the generation of multiple-faculty proposals to support the specific research directions defined in the strategic plan.

Data-Driven Design of Li-ion Batteries

Professors Bazant and Braatz continued managing the Center on Data-Driven Design of Li-ion Batteries (D3BATT) which has raised $12M so far. D3BATT is developing a multiscale modeling framework for rechargeable batteries to accelerate materials discovery and design. This year's publications included (1) a unified quantum mechanical theory of coupled ion-electron transfer, which unifies Marcus kinetics of electron transfer with Butler-Volmer kinetics of ion transfer, and (2) a computationally efficient method for the optimization of charging protocols that accounts for thermal effects and battery degradation. They also released updates of their open-source implementations of the porous electrode theory model in Python and Julia.

Advances in Biomanufacturing

Professors Braatz, Sinskey, and Springs at the Center for Biomedical Innovation (CBI) co-lead more than a half dozen projects funded by the U.S. Food & Drug Administration in advanced technologies for the manufacturing of biotherapeutic drugs. Technologies integrate a wide variety of techniques including artificial intelligence, natural language processing, machine learning, mechanistic modeling, sensors, and the design of modular automated systems. CBI partners span three schools and numerous departments, and specific biotherapeutics include monoclonal antibodies, cell and gene therapies, and vaccines.

Continuous mRNA Manufacturing

Professors Braatz and Myerson co-lead a new center that aims to design the world's first fully integrated, continuous mRNA manufacturing platform, in an $82 million effort funded by the U.S. Food and Drug Administration (FDA) Center for Biologics Evaluation and Research. The resulting pilot-scale system is intended to improve society's ability to respond to future pandemics as well as accelerate the development and production of mRNA technologies, which companies are investing in at unprecedented scales in hopes of developing new vaccines as well as new treatments to cancers, metabolic disorders, and genetic diseases.

Defense Advanced Research Projects Agency (DARPA) AMD Project and MLPDS Industry Consortium

The DARPA Accelerated Molecular Discovery (AMD) project aims to accelerate chemical innovation. The project team investigators from Computer Science (Profs. Barzilay and Jaakkola), Chemical Engineering (Profs. Coley, Green, and Jensen (lead)), and Materials Science and Engineering (Prof. Gomez-Bombarelli) integrate machine learning text extraction, property prediction, and generative models with a new automated, high throughput experimental platform in the Jensen lab to realize autonomous molecular discovery of molecules. Now in its fourth and last year, the project has closed the molecular discovery cycle of prediction, synthesis, measurement, and model retraining, demonstrating the potential for autonomous platforms to learn chemical information and discover new functional molecules.

Profs. Barzilay, Coley, Green, Jaakkola, and Jensen continued to work with scientists and engineers from member companies (Amgen, BASF, Bristol Myers Squibb, Corteva, Janssen, Lilly, Merck, Novartis, and Pfizer) in the consortium on Machine Learning for Pharmaceutical Discovery and Synthesis (MLPDS) (mlpds.mit.edu) to create new advances in data science for chemical and pharmaceutical discovery and development. Importantly, the consortium educated scientists and engineers to work effectively at the data science/chemistry interface.

Disruptive and Sustainable Technology for Agricultural Precision (DiSTAP), IRG in the MIT-Singapore SMART Program

The Disruptive and Sustainable Technology for Agricultural Precision (DiSTAP) center, as a part of the MIT-Singapore SMART program, was just renewed by the Singapore government for another 4 years of operation. DiSTAP is producing next-generation sensors and analytical instrumentation, plant delivery and environmental tools for the urban farm of the future. Lead by Professor Michael S. Strano (Course 10), the DiSTAP team includes MIT Professors Benedetto Marelli (Course 1) working on applications of silk and biomaterial technology for agriculture and Professor Rajeev Ram (Course 6) pioneering Raman spectroscopy and instrumentation for indoor and open field farming. The team is currently working with high tech urban farms in Singapore to testbed DiSTAP sensor technology and techniques.

The Center for Enhanced Nanofluidic Transport (CENT), Energy Frontier Research Center funded by the U.S. Department of Energy

The Center for Enhanced Nanofluidic Transport (CENT) is an Energy Frontier Research Center funded by the U.S. Department of Energy and has just been renewed for another 4 years of operation. Led by founder and Scientific Director Professor Michael S. Strano, as well as other course 10 faculty, CENT is focused on basic understanding of fluidic transport under extreme confinement. This year, CENT made pioneering advances in understanding electrolyte flow through conduits under extreme confinement. The CENT team also made pioneering breakthroughs in understanding ion solvation, nanofluidic transport, and membrane technology.

Research Highlight

Model-guided design of highly compact, genetically encoded synthetic gene circuits

Kate E. Galloway, Department of Chemical Engineering

Over the last decade, advances in genome engineering and stem cell biology have massively expanded the potential of engineered cells as therapeutics. However, engineering mammalian cells remains limited by inefficient methods of genome engineering, slow workflows, and emergent failures of stable cell lines. As a diverse group of engineers working at the intersection of stem cell biology, synthetic biology, and molecular systems biology, the Galloway lab aims to make the programming of mammalian cells fast, reliable, and efficient.

The field of synthetic biology has grown and expanded to the engineering of mammalian cells. To rapidly advance gene and cell-based therapies, synthetic biology aims to harness the power of native biology by constructing synthetic gene regulatory networks capable of dynamically prescribing cellular processes, states, and identities. However, rational *de novo* design of synthetic circuits for cell engineering remains challenging. Additionally, delivery of large genetic cargoes limits the efficiency of cellular engineering. To overcome these challenges, we are pioneering the development of compact synthetic circuits that perform in diverse cells.

Co-localization of multiple transcriptional units at a single site in the genome provides a simple method of engineering compact design. However, co-localization introduces the potential for physical coupling between transcriptional units. Depending on the design objective, coupling between units may support or impede performance of the circuit. To capture the emergent coupling between genes, we developed a mathematical framework for integrating biochemical and biophysical gene regulation into a unified model. We used this model to explore different two-gene designs. The research was highlighted on the cover of Cell Reports

Figure 1. Supercoiling-dependent feedback couples and tunes transcription. As RNA polymerases (yellow) transcribe DNA (pink) into RNA (orange), the melting of the double helical polymer induces winding and underwinding of DNA. As the density of supercoiling influences the energy of subsequent RNA polymerases binding, supercoiling induces coupling of transcription between adjacent genes. Art by Christopher Johnstone.

Transcription induces a wave of DNA supercoiling, altering the binding affinity of RNA polymerases and reshaping the biochemical landscape of gene regulation (Fig 1). As supercoiling rapidly diffuses, transcription dynamically reshapes the regulation of proximal genes, forming a complex feedback loop. As gene co-localization represents a common motif in biological systems, physical proximity may enable transcriptional coupling through DNA supercoiling. Putatively, the resulting inter-gene coupling provides a mechanism to control transcriptional variance of co-localized native circuits. If understood, co-local mechanisms of coupling could inform the design of synthetic circuits to improve performance. However, a theoretical framework is critically needed for integrating both biophysical and biochemical transcriptional regulation. To address this challenge, we developed a framework for integrating biochemical gene regulation with the biophysical effects of DNA supercoiling into a unified model. Using this model to investigate the role of supercoiling-mediated feedback within multi-gene systems, we find that DNA supercoiling strongly influences the profile of gene expression. The influence of supercoiling is defined by syntax—the relative orientation and position of genetic elements—and the enclosing boundary conditions

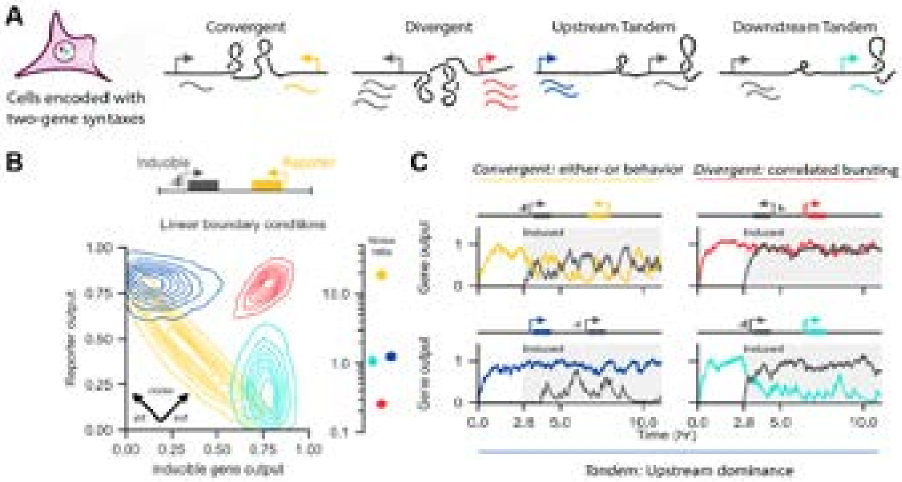

Figure 2. Supercoiling-dependent feedback induces syntax-specific expression profiles. a) Two-gene circuits serve as a testbed for investigating supercoiling-mediated feedback. All four syntaxes include a reporter gene (colored) and an inducible gene (gray). b) Gene expression distributions and the intrinsic to extrinsic noise ratios are shown for ensembles of simulations with linear boundary conditions. Reporter output is normalized by dividing counts by a constant value (340 mRNAs). c) mRNA counts over time from representative simulations for the four syntaxes. Simulations are initialized with only the reporter gene (colored) active, with the adjacent gene (gray) enabled with equal basal expression after ten thousand seconds (2.8 hours).

Syntax, the relative arrangement of gene orientation, represents an emerging design feature for tuning gene expression, noise, and dynamics. Our model of transcription-induced DNA supercoiling suggests that both expression dynamics and steady state output are strongly influenced by gene syntax (Fig 2). In alignment with our model, our experimental data in HEK293T cells indicates that induction of expression from the tet-inducible element in divergent syntax increases expression of a reporter gene (2). In tandem syntax, the reporter expression decreases. Our data suggest that supercoiling may contribute to circuit failures such as transgene silencing which have been previously attributed to burden and epigenetic silencing. Together our models and data indicate that syntax powerfully influences gene expression of co-localized genes, which could be harnessed to improve designs.

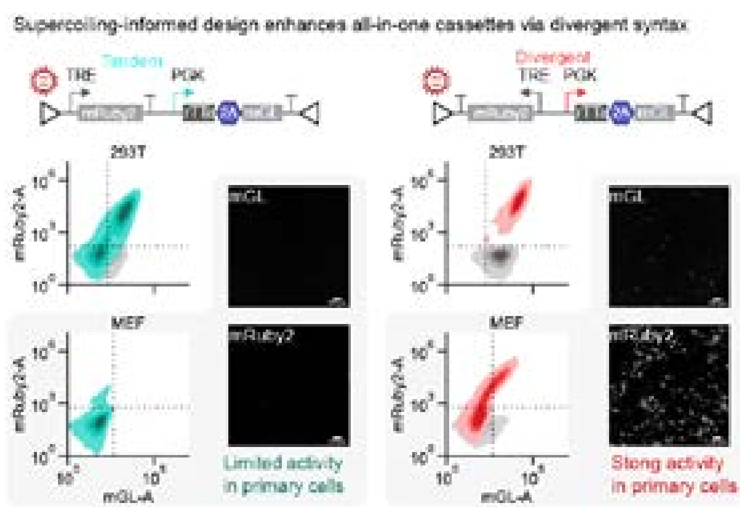

Figure 3. Supercoiling-dependent feedback induces syntax-specific expression profiles. a) Schematic of piggyBac integrated constructs b) Mean fluorescence intensity of the mGreenLantern (mGL) reporter as a function of doxycycline concentration for divergent and tandem syntax. Shading CI 95%. Data unpublished.

As a primary cell type, mouse embryonic fibroblasts (MEFs) offer a challenging testbed for transgenic systems. Our lab uses MEFs for cellular reprogramming experiments. Previously, our work to test induction of specific genes during reprogramming was hampered by poor transgene expression. We recently applied our findings on supercoiling-mediated feedback to solve the issue of transgene mosaicism and silencing in primary cells. Expression from the tet-inducible element relies on sufficient expression of the transactivator, rtTa. For "all-in-one" systems that offer simplicity of delivery, the rtTa is often constitutively expressed in tandem to the tet-inducible gene. The resulting mosaicism is attributed to limited expression of the rtTa. From our model of supercoiling-mediated feedback, we reasoned that composing a tet all-in-one system with divergent syntax would induce positive biophysical feedback and improve the expression of both the rtTa and the tet-regulated gene (Fig 4). In HEK293T cells, lentiviral delivery of the tet all-in-one with divergent syntax eliminated mosaicism that was observed in tandem. Additionally, divergent syntax rescued dox-inducible expression in MEFs.

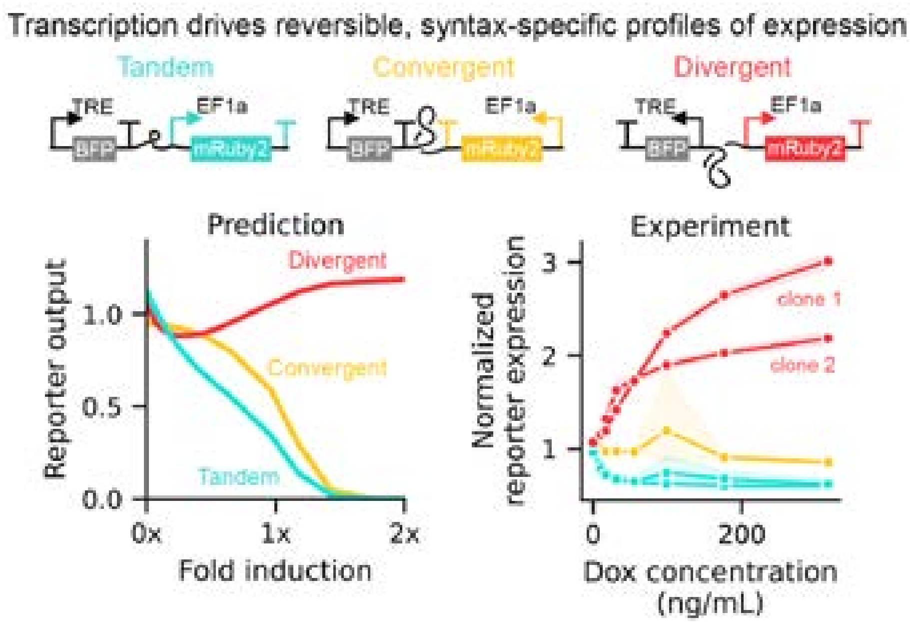

Figure 4. Supercoiling-dependent feedback induces syntax-specific expression profiles. Schematic of the lentiviral constructs with tet-inducible all-in-one with tandem syntax and divergent syntax. The transactivator rtTA is expressed from the constitutive human PGK promoter (hPGK) with mGreenLantern (mGL). Flow cytometry joint distribution plots in the presence (+dox) and absence (-dox) of 300 ng/mL doxycycline for mGL and mRuby2 for tandem (left) and divergent (right) syntax in 293Ts (top) and MEFs (bottom). Fluorescence images of MEFs. Data unpublished.

In exploring both synthetic and native gene regulatory networks, we find that supercoiling-mediated feedback changes the behaviors accessible to genetic control. Altogether, our work provides a design framework for improving the predictable design of gene networks, accessing previously inaccessible regulatory dynamics, and developing novel regulatory functions. Importantly, we have experimentally confirmed several predictions and used this model to design circuits with massively improved performance in primary cells. With these improved tools we can reliably turn on arbitrary set of genes to probe how those genes influence cell fate. Specifically, we will use these new tools to precisely examine how the timing and concentration of specific transgenes impact the process of reprogramming and the yield and quality of cells. More broadly, improved transgenic systems will impact gene and cell-based therapies which remain limited by poor scalability and predictable performance. By establishing more accurate design frameworks, we will rapidly engineer the next-generation of gene and cell-based therapies.

Professor Katie Galloway is the W. M. Keck Career Development Professor in Biomedical Engineering and Chemical Engineering at Massachusetts Institute of Technology. Her lab focuses on developing integrated gene circuits and elucidating the systemslevel principles that govern complex cellular behaviors. The lab has pioneered key methods for building and validating genetic controllers as well as developed foundational technologies for engineering highly efficient cellular reprogramming to neurons. In the last year, the group's work has been published at *Cell Reports and Cell Systems*. In 2022, Professor Galloway founded the Boston Mammalian Synthetic Biology Symposium, a trainee-focused meeting attended by representatives from over 40 labs in the Boston area. In 2023, Professor Galloway was honored as BMES Cellular and Biomolecular Engineering Rising Star Award which recognizes an engineer who is at their early independent career stage and has made an outstanding impact on the field of cellular and molecular bioengineering. She was one of two 2023 finalists for the Rosalind Franklin Society Medal, which recognizes the outstanding body of research of a woman in the field of genome engineering and nucleic acids research.

Annual Lectures and Seminars

The weekly department seminar series was held in-person, allowing us to host a distinguished group of academic and industry leaders, speaking on topics highlighting cutting-edge research addressing today's energy and health-related challenges. Webcasts for all major lectures can be accessed at http://cheme.mit.edu/events/.

The 2022-2023 Named Lectures included:

- 8th Annual D.I.C. Wang Lecture on the Frontiers of Biotechnology (September 16, 2022): "The *terra incognita* of antibody immunity: implications for human health and antibody immunity" Prof. George Georgiou, Department of Chemical Engineering and Molecular Biosciences, UT, Austin

- Inaugural Charles L. Cooney Lecture (September 23, 2022): "Squeezing Cells: From Serendipitous Discovery to Patient Impact" Dr. Armon Sharei, SQZ Biotech, CEO/Founder

- 36th Hoyt C. Hottel Lecture in Chemical Engineering (October 7, 2022): "Physical and Chemical Models for the Emergence of Biological Homochirality" Prof. Donna Blackmond, Scripps Research

- 29th Alan S. Michaels Lecture in Medical and Biological Engineering (March 10, 2023): "Design for inference: the power of random experiments in biology" Dr. Aviv Regev, Genentech, Head of Genentech Research and Early Development

- 44th Warren K. Lewis Technical Lecture (May 23, 2023): "Multiscale Modeling of Polymers at Interfaces and Polymer-Matrix Nanocomposites" Prof. Doros Theodorou, NTUA Professor of Chemical Engineering at the National Technical University of Athens, Greece (NTUA)

- 44th Warren K. Lewis Lecture (May 24, 2023): "Atomistic and Mesoscopic Modeling of Structure-Property Relations in Polymers" Prof. Doros Theodorou, NTUA Professor of Chemical Engineering at the National Technical University of Athens, Greece (NTUA)

The Department Awards Ceremony was held on May 15th, 1 2023. This year's recipient of the C. Michael Mohr Outstanding Faculty Award selected by the undergraduate students was Will Tisdale. For the James W. Swan Outstanding Faculty Award selected by the graduate students, we are pleased to recognize Arup Chakraborty.

The Edward W. Merrill Outstanding Teaching Assistant Award was presented to Class of 2024 student Yijun Yang, TA for 10.10 during the Fall 2022 term. The Outstanding Graduate Teaching Assistant Award was presented to PhD student Eric Hahnert for his work in 10.50 in the Fall 2022 term. All third-year graduate students are required to present a seminar on the progress of their research, and the two recipients of the Award for Outstanding Seminar were Namita Nabar (Hammond Lab) and Bhavish Dinakar (Roman Lab).

Chemical Engineering Special Service Awards were conferred to the members of the Graduate Student Council: Kat Fransen, Eric Hahnert, Joules Provenzano, Eliza Price, Sneha Kabaria, Bhavish Dinakar, Omar Aly, Lexi Dubs, Alex Cohen, and Nick Matteucci. Members of the Graduate Student Advisory Board were also recognized: Bert Neyhouse, Brianna Lax, Eric Hahnert, James Owens, Jennifer Fang, Mary Agnes Joens, Michael Li, and Sydney Johnson.

Members of the Graduate Women in Chemical Engineering group were recognized: Haley Beech, Kat Fransen, Katherine Steinberg, Kaylee McCormack, Kelsey Reed, Namita Nabar, and Narumi Wong.

Awards were also given to the members of the REFS (Resources for Easing Friction and Stress) group: Akiva Gordon, Emily Krucker Velasquez, Xioajia (Cindy) Jin, Pradeep Natarajan, Leslie (Jianqiao) Cui, and Joy Zeng.

Members of Diversity in Chemical Engineering were recognized: Alexander Quinn, Celestine Hong, Emily Krucker Velasquez, Jennifer Fang, Joseph Maalouf, K'yal Bannister, Karian Moreno Sader, Kat Fransen, Landon Schofield, Mateusz Wojtaszek, Nathan Wang, Sachin Bhagchandani, Sydney Johnson, and Victoria Gomerdinger.

The Michael Johnson Award went to Juliet Okorie. Nathan Stover won the Chemical Engineering Rock Award for his contributions to intramural athletic achievement within the Department.

The following undergraduate students were also recognized for their service to the student chapter of AIChE: Julia Van Cleef, Tatum Wilhelm, Yijun Yang, Ezra Gordon, Duha Syar, Victoria Yang, Alfonso Restrepo, Fiona Shortt, Khiem Nguyen, Annlin Su, Megan Eaton, Adeena Khan, Austin Chin, Seraphin Castelino, Binette Wada, Smah Riki, Freya Edholm, and Katie Bailey.

Service awards also went to the officers of the Undergraduate Student Advisory Board: Freya Edholm, Victoria Yang, Rachel Ahlmark, Ani Sibel, Sydney Pyon, and Janet Teng

Our undergraduates also earned numerous accolades over the year. The Robert T. Haslam Cup, which recognizes outstanding professional promise in chemical engineering, went to Victoria Yang. Our oldest prize, the Roger de Friez Hunneman Prize, is awarded to the undergraduate who has demonstrated outstanding achievement in both scholarship and research; this year it went to Ololade Abdulai. The Lourdes C. and Wing S. Fong Memorial Prize, awarded to a chemical engineering senior of Chinese descent with the highest cumulative GPA was awarded to Victoria Yang and Anna Mai. Additionally, the 2023 Phi Beta Kappa electee was Stefan Damchevski.

The Department is pleased to recognize Melanie Charette and Christopher Monaco as the Department's Outstanding Employees of the Year for their dedication and exceptional service to faculty, staff, and students. Six Chemical Engineering Individual Accomplishments awards were given out to Graduate students Kat Fransen, Katie Groenhout, Mary Agnes Joens, Eric Hahnert, and Pradeep Natarajan. The Chemical Engineering Diversity, Equity, and Inclusion Awards were presented to Duha Syar (undergraduate), Kat Fransen (graduate), Fikile Brushett (faculty). In addition, two of our staff members won awards from the School of Engineering: Christopher Monaco received the Infinite Mile Award, and Melanie Kaufman received the Ellen J. Mandigo Award.

Paula T. Hammond
Head
Institute Professor

Kristala L. J. Prather
Executive Officer
Arthur D. Little Professor of Chemical Engineering