

Ethan Pickering, Ph.D.

Personal Information

Mobile	440-387-7765
Email	ethan.pickering@uga.edu; ethan.m.pickering@gmail.com
Website	ethanpickering.com
Social Media	ResearchGate LinkedIn Google Scholar, (citations: 640, h-index: 11, i10-index: 13)



Education

Mar 2021 – Mar 2022	Massachusetts Institute of Technology <i>Cambridge, Massachusetts</i> Postdoctoral Associate, Mechanical Engineering, Advisor: Themis Sapsis <i>Active Learning methods for Bayesian Design and Optimization of extreme and rare events.</i>
Aug 2016 – Feb 2021	California Institute of Technology <i>Pasadena, California</i> Doctorate of Philosophy, Mechanical Engineering, Advisor: Tim Colonius <i>Thesis: Resolvent Modeling of Turbulent Jets</i>
Aug 2016 – Jun 2018	California Institute of Technology <i>Pasadena, California</i> Master of Science, Mechanical Engineering
Jan 2016 – Jul 2016	Case Western Reserve University <i>Cleveland, Ohio</i> Master of Science, Mechanical Engineering <i>Thesis: EDIFES 0.4: Scalable Data Analytics for Commercial Building Virtual Energy Audits</i>
Aug 2011 – Dec 2015	Case Western Reserve University <i>Cleveland, Ohio</i> Bachelor of Science, Mechanical & Aerospace Engineering <i>summa cum laude</i>

Research Employment History & Appointments

Jan 2026–Present	University of Georgia, Assoc. Professor (w/o tenure, tenure-track) <i>Athens, GA</i> Crop and Soil Sciences ○ Build and lead the Computational Agriculture Lab, currently advising two postdocs.
Jan 2026–Present	Prophet AI, Founder & CEO <i>Athens, GA & Boston, MA</i> ○ Lead team and vision to realize fully digitized and AI-enabled livestock barns at scale.
Jun 2024–Dec 2025	Bayer Crop Sciences, Head of Data Science and AI Research <i>Boston, MA</i> ○ Lead, train, and mentor a diverse team of 28 PhD scientists: junior to distinguished, 15+ degree disciplines (e.g. biology, breeding, engineering, mathematics), > \$5M/yr OpEx ○ Direct the foundational data science and AI model development enabling crop improvement.
Nov 2024 – Dec 2025	University of Georgia, Adjunct Professor <i>Athens, Georgia</i> Crop and Soil Sciences ○ Co-advise postdocs (2) in large-language DNA modeling and bio-informed neural networks.
Mar 2022–May 2024	Bayer Crop Sciences, AI Genomics Modeling Team Lead <i>Boston, MA</i> ○ Hire, lead, train, and mentor 8-member team of machine learning (ML) PhD data scientists to develop and deploy ML/Digital Twin solutions leveraging high-throughput genetic, env., and mgmt. data, for phenotypic prediction and genomic design of high-performing crops.
Jan 2023 – Jun 2023	Massachusetts Institute of Technology, Lecturer <i>Cambridge, Massachusetts</i> Mechanical Engineering ○ Lecture PhD graduate courses in stochastic systems, nonlinear dynamics, and machine learning. Course 2.121/2.122, Spring 2023

Teaching

MIT	Stochastic Systems 2.122, graduate, (lecturer)
Caltech	Dimensional and Data Analyses in Engineering, undergraduate, (co-instructor/co-designer)
Case Western	Calculus II for Scientists and Engineers, undergraduate (TA)
Case Western	Calculus I for Scientists and Engineers, undergraduate (TA)

Invited Talks

- Plant & Animal Genome Conference, **Mechanistic AI for Agriculture: Tailoring Architectures, Loss Functions, and Data Acquisition for Agricultural Insights and Design** (2026)
- CANVAS, **Agricultural AI to Bridge the Scales of Genotype, Environment and Phenotype for Crop Improvement in the Sparse Data Limit** (2025)
- AI-Driven Drug Discovery Summit **Designing Crop Genomes with AI Digital Twins and Bio-Informed Neural Networks** (2025)
- AI-Driven Drug Discovery Summit **Panel: From General Models to Contextual Intelligence in Drug Discovery: Why One-Size-Fits-All Biology Fails and What Contextual Reasoning Can Fix** (2025)
- MIT Civil & Environmental Engineering, **Beyond Yield: Agricultural AI to Bridge the Scales of Genotype, Environment and Phenotype in the Sparse Data Limit** (2025)
- NSF BIO Distinguished Lecture, **From Art to Empiricism: Bridging AI and Biology in Plant and Animal Breeding** (2024)
- AI-Driven Drug Discovery Summit **Accelerating Genomic and Product Design from Bio-Informed Graph Neural Networks to Disease Resistance-Preserving Loss Functions** (2024)
- AI in Plant Breeding Symposium, College of Agricultural Science, University of Georgia, **AI genotype-phenotype modeling for crop improvement** (2024)
- MIT CSAIL Alliances 2024, **AI's Critical Role in Keeping Pace with Global Agricultural Demands** (2024)
- CROPS 2024, **AI in genomics: From large language modeling for editing to bio-informed graph neural networks for modeling metabolic pathways** (2024)
- Plant & Animal Genome Conference, **Advancing AI genotype-phenotype modeling for crop science: from rare-event loss functions to biologically-informed graph neural networks** (2024)
- MIT Aerospace Computational Design Laboratory Seminar Series, **AI-Assisted Decision Making from Physics to Genetics Discovering Extreme Events, Uncovering Optimal Designs, and Eliminating Misleading Data** (2023)
- Bayer Innovations in Crop Science Mega-Symposium, **Translating editing for population improvement with AI** (2023)
- MDS3-COE Seminar, Case Western Reserve University, **AI-Assisted Decision Making for Physics: Discovering Extreme Events, Uncovering Optimal Designs, and Eliminating Misleading Data** (2022)
- Waves and Flow Seminar Series, University of Oxford, **Active learning of nonlinear operators via neural nets for predicting extreme events** (2022)
- Euromech Colloquium on Uncertainty Quantification in Computational Mechanics, **Active learning of nonlinear operators via neural nets for predicting extreme events** (2021)
- Case Western Reserve University, Mechanical & Aerospace Engineering Seminar, **Means & Extremes - Modeling the impacts of the ordinary and the extraordinary** (2021)
- Case Western Reserve University, SDLE Center Seminar, **Active learning of nonlinear operators via neural nets for forecasting extreme events** (2021)

- Mechanistic Machine Learning and Digital Twins for Computational Science, Data-Driven Reduced-Order Methods for System Control, **On Predictive Resolvent-Based Turbulence Models** (2021)
- Euromech Colloquium on Jet Noise Modelling and Control, **Resolvent-based modeling of jet noise** (2021)
- Bayer Crop Sciences, **Means & Extremes: Modeling the impacts of the ordinary and the extraordinary** (2021)

Journal Articles

1. Kontolati, K., Gladstone, R. J., Davis, I., and **Pickering, E.**, "Biology-informed neural networks learn nonlinear representations from omics data to improve genomic prediction and interpretability," *Submitted to Nature ML, arXiv preprint arXiv:2510.14970*, 2025
2. Bucksch, A., **Pickering, E.**, et al., "Plant Phenomics – The Unrecognized Rise of an Interdisciplinary Scientific Discipline," *Submitted to Nature Plants*, 2025
3. Nekkanti, A., **Pickering, E.**, Schmidt, O. T., and Colonius, T., "Bispectral decomposition and energy transfer in a turbulent jet," *Accepted to Journal of Fluid Mechanics, arXiv preprint arXiv:2502.15091*, 2025
4. **Pickering, E.** and Sapsis, T. P., "Information FOMO: The unhealthy fear of missing out on information. A method for removing misleading data for healthier models," *Entropy*, 2024
5. Li, Y., Noack, B. R., Wang, T., Cornejo Maceda, G. Y., **Pickering, E.**, Shaqarin, T., and Tyliszczak, A., "Jet mixing enhancement with Bayesian optimization, deep learning and persistent data topology," *Journal of Fluid Mechanics*, Vol. 991, 2024, pp. A5
6. Maia, I. A., Heidt, L., **Pickering, E.**, Colonius, T., Jordan, P., and Brès, G. A., "The effect of flight on a turbulent jet: coherent structure eduction and resolvent analysis," *Journal of Fluid Mechanics*, Vol. 985, 2024, pp. A21
7. **Pickering, E.**, Guth, S., Karniadakis, G. E., and Sapsis, T. P., "Discovering and forecasting extreme events via active learning in neural operators," *Nature Computational Science*, Vol. 2, No. 12, 2022, pp. 823–833
8. **Pickering, E.**, Karniadakis, G. E., and Sapsis, T. P., "On the quality of uncertainty of Deep Neural Networks and their comparison to Gaussian Process Regression," *arxiv preprint arxiv:2203.04515*, 2022
9. Towne, A., Rigas, G., Kamal, O., **Pickering, E.**, and Colonius, T., "Efficient global resolvent analysis via the one-way Navier–Stokes equations," *Journal of Fluid Mechanics*, Vol. 948, 2022, pp. A9
10. **Pickering, E.**, Towne, A., Jordan, P., and Colonius, T., "Resolvent-based modeling of turbulent jet noise," *The Journal of the Acoustical Society of America*, Vol. 150, No. 4, 2021, pp. 2421–2433
11. **Pickering, E.**, Rigas, G., Schmidt, O. T., Sipp, D., and Colonius, T., "Optimal eddy viscosity for resolvent-based models of coherent structures in turbulent jets," *Journal of Fluid Mechanics*, Vol. 917, 2021

Patents

1. Spratt, J. S. and **Pickering, E.**, "Systems and Methods for Modeling Agricultural Environments," 2026, US Prov. 63/728,004
2. **Pickering, E.** et al., "Methods and Systems for Use in Trait Development in Agricultural Crops," April 2025, US Patent App. 18/915,306
3. Carpenter, N., Chavali, S. P. K., Dutta, B., Fleming, D. P., Ghosal, S., Gillespie, M. E., Gold, A., Liao, W. T., Miao, C., **Pickering, E. M.**, et al., "Methods And Systems For Use In Trait Interpretation In Agricultural Crops," Nov. 14 2024, US Patent App. 18/658,888
4. Abramson, A., French, R., **Pickering, E.**, Hossain, M., Khalilnejad, A., and Haddadian, R., "Systems and methods for data analytics for virtual energy audits and value capture assessment of buildings," Aug. 2 2022, US Patent 11,403,647

Conference Papers

1. Gramiscelli Hasparyk, B., Jordan, P., Lebedev, A., Lesshafft, L., **Pickering, E.**, and Colonius, T., "Two-point measurements on the acoustic field of subsonic turbulent jets," *AIAA AVIATION 2023 Forum*, 2023, p. 4290

Academic Service & Memberships

Committees	International Plant Phenotyping Network: The Science of Phenomics Working Group
Paper Referee	The Plant Journal, Nature Machine Intelligence, Journal of Computational Physics, Journal of Fluid Mechanics, Journal of Fluid Mechanics Rapids, Physics of Fluids, Journal of the Acoustical Society of America, Theoretical and Computational Fluid Dynamics, Sustainable Cities and Society, Aerospace
Session Chair	SIAM Annual Meeting (Machine Learning, 2022), Euromech Colloquium Jet Noise Modelling and Control (Reactive Flows, 2021)
Member	International Plant Phenotyping Network, American Institute of Aeronautics and Astronautics (AIAA), American Physical Society (APS), Acoustical Society of America (ASA)

Public Grants

PD, Pending, 2026	AFRI-FAS A1541 DSFAS-SEED, RFP via USDA, Project: Seeding Ag CRADLE: An Open Agricultural Data Ecosystem to Power the Next Generation of AI Crop Growth Models, \$300,000 Award, UGA
Co-PI, Pending, 2026	AFRI-FAS A1541 DSFAS-CIN PARTNERSHIP, RFP via USDA, Project Phenomics Data Science Cooperative, \$1,100,000 Award, UGA
PD, Awarded, 2025	InnovateMass, Funded by Massachusetts Clean Energy Center, Project: Eliminating Waste with AI-Powered Poultry Welfare Monitoring, \$335,100 Award, Prophet AI
PD, Awarded, 2024	Cobb Research Initiative, Funded by Cobb-Vantress, Project: Virtual Data Powered AI for Precision Health Phenotype Tracking, \$310,200, Prophet AI

Theses

Ph.D. Thesis	Pickering, E. , <i>Resolvent modeling of turbulent jets</i> , Ph.D. thesis, California Institute of Technology, 2021
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Research Interests

BIOLOGICAL DESIGN	AI-assisted genomic design, environmental modeling, digital twins, GxExM modeling
MACHINE LEARNING	active learning, Gaussian process regression, deep neural networks/operators, Bayesian models
STOCHASTIC MODELS	rare/extreme events, uncertainty quantification, Bayesian experimental design & optimization
DATA SCIENCE	data quality metrics and methods, vio- and physics-informed methods, data-assimilation
CONTROL	active and passive control, precursor identification, dynamic optimization