💌 regenwet@mit.edu | 🏕 lyleregenwetter.github.io/ | 🖸 Lyleregenwetter | 🛅 lyle-regenwetter-83600714a | 🞓 Lyle Regenwetter

Education

Massachusetts Institute of Technology (GPA: 4.9/5.0)

Cambridge, MA

• PhD. Candidate (Dec. 2025 anticipated)

Sep. 2020 - Present

• S.M. in Mechanical Engineering (May 2022),

University of Illinois at Urbana-Champaign (GPA: 3.9/4.0)

Urbana. II

• B.S. in Mechanical Engineering with highest honors

Aug. 2016 - May 2020

· B.S. in Electrical Engineering with high honors

• Minor in Computer Science

Research Experience

MIT Design Computation and Digital Engineering Lab

Cambridge, MA

Ph.D. Candidate, Inaugural Member

Aug. 2020 - Present

· Pioneering "Generative Optimization" frameworks that combine generative AI and direct design optimization

• Developing new training formulations for Generative AI models using hard negative examples

· Developed five open-source design datasets spanning bicycle design to structural optimization

UIUC Networked Autonomous Vehicles Laboratory

Urbana, IL

UNDERGRADUATE RESEARCH ASSISTANT

Jan. 2019 - Jul. 2020

• Developed autonomous hovercraft for research of multimodal drone swarms

• Led design, simulation, and fabrication of custom bidirectional propellers

• Designed custom hardware (bidirectional propellers, air bearing, printed circuit boards with computation, power, sensing systems)

• Implemented software and control (Kalman sensor fusion filter, path following control)

UIUC Smith Research Group

Urbana, IL

Undergraduate Research Assistant

Jan. 2020 - May. 2020

• Added controlled recirculation to Cation Intercalation Desalination (CID) cell

Designed system simulation and machine learning driven system optimization

Designed and built custom electrical system for power, pump control, valve actuation

UIUC Center for Plasma-Material Interactions

Undergraduate Research Assistant

Nov. 2017 - May. 2019

- · Designed magnet pack geometry and electrical pulse waveform to optimize atomic deposition processes
- Upgraded and maintained vacuum chamber & accessories

Journal Publications

MCD: A Model-Agnostic Counterfactual Search Method for Multi-Modal Design Modifications

Published

JOURNAL OF MECHANICAL DESIGN

Feb. 2025

- Authors: Regenwetter, L; Abu Obaideh, Y; Ahmed, F
- Project Page: decode.mit.edu/projects/counterfactuals/

Constraining Generative Models for Engineering Design with Negative Data

Published

TRANSACTIONS ON MACHINE LEARNING RESEARCH (TMLR)

Dec. 2024

• Authors: Regenwetter, L; Giannone, G; Srivastava, A; Gutfreund, D; Ahmed, F

Beyond Statistical Similarity: Rethinking Metrics for Deep Generative Models in Eng. Design COMPUTER AIDED DESIGN

Published Oct. 2023

- Authors: Regenwetter, L; Srivastava, A.; Gutfreund, D.; Ahmed, F
- Project Page: decode.mit.edu/projects/metrics/
- · Article: https://meche.mit.edu/news-media/excel-engineering-design-generative-ai-must-learn-innovate-study-finds

FRAMED: An AutoML Approach for Structural Performance Prediction of Bicycle Frames

Published

COMPUTER AIDED DESIGN

Nov. 2022

- Authors: Regenwetter, L; Weaver, C.; Ahmed, F
- Project Page: decode.mit.edu/projects/framed/

BIKED: A Dataset for Computational Bicycle Design with Machine Learning Benchmarks JOURNALO P MECHANICAL DESIGN Sop. 2021 - Authors: Repenwetter, L. Cury, R. Ahmed, F. Project Page: decorder mit adulymojects/shead/ Low prorosity, high areal-capacity Prussian blue analogue electrodes enhance salt removal and thermodynamic efficiency in symmetric Faradaic deionization with automated fluid control Water Research X Authors: Relap. PR. Regenwetter, L. Agrawal, A.; Dardon, R.; Dicola, R.; Sanagala, S.; Smith, KC - Article: mechas, Bitrois-adu/mews/41296 Conference and Workshop Publications Towards Domain-Adaptive Resolution-Free 3D Topology Opt. with Neural Implicit Fields International, Desion Engineering Technical Conferences - Authors: Relap. Agr. Regenwetter, L.; Adrawal, R Authors: Mary, Rr.; Regenwetter, L.; Adrawal, R Authors: Alama, Rr.; Regenwetter, L.; Adrawal, R Authors: Regenwetter, L.; Cury, B.; Ahmod, F. Publications Under Review - Authors: Regenwetter, L.; Cury, B.; Ahmod, F. Publications Under Review - Authors: Picard, A.R.; Regenwetter, L.; Clearnone, C.; Ahmed, F. Research Presentations - Authors: Regenwetter, L.; Cury, B.; Ahmod, F. Research Presentations - Authors: Picard, C.; Regenwetter, L.; Cury, B.; Ahmod, F. Research Presentations - Authors: Picard, C.; Regenwetter, L.; Clearnone, C.; Ahmed, F. Research Presentations - Research Presentations - Research Presentations - R	Deep Comparative Medala in Engineering Designs A Designs	5 11:1 1
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• Poster Presentation: Further Characterization of HiPIMS & Serpentine Linear Magnetron; w/ Bartlett, N; Aktuna, A Apr. 2019	UIUC undergraduate research symposium	Urbana, IL
	• Poster Presentation: Further Characterization of HiPIMS & Serpentine Linear Magnetron; w/ Bartlett, N; Aktuna, A	Apr. 2019

2

Teaching Experience

MIT 2.s155/6: Artificial Intelligence and Machine Learning for Engineering Design

Cambridge, MA

TEACHING ASSISTANT (4 SEMESTERS)

Sep. 2021 - Present

- · Designed challenge problems, course demos, and reading assignments for first four offerings of this graduate course
- Teaching performance rated 6.7/7.0, averaged over 75 course evaluations across four semesters

Work Experience _____

Boeing Huntsville, AL

ELECTRICAL ENGINEERING INTERN

Jun. 2019 - Aug. 2019

- US Missile Defense Agency Project ICBM tracking and interception
- Developed sensor feedback logic, designed wiring and connector layouts
- Responsible for system wide wiring database, coordinated design interfacing between teams, corrected over 1000 database errors
- Revised, updated, and verified critical design documentation

Denso Battle Creek, MI

PROCESS ENGINEERING RESEARCH AND DEVELOPMENT INTERN

Jun. 2018 - Aug. 2018

- Developed a proof-of-concept contactless dimensional measurement system using infrared laser array
- Identified \$5.4 million of unaccounted scrap through statistical field investigation, reported to Denso global president
- Proposed Design of Experiments (DOE) testing procedure to assess 3D printing & post-processing methods for service part fabrication
- Tested additive manufacturing materials and processing including: Ultem, Nylon, ABS, vapor treatment, annealing, epoxy coating

Scholarships & Honors_

2024	Fellowship , MIT Morningside Academy of Design (MAD) Fellowship	Cambridge, MA
2022	Honorable Mention, NSF Graduate Research Fellowship Program	Cambridge, MA
2022	Third Place, 2022 ASME-CIE Hackathon	St. Louis, MO
2020	Runner up, 2020 ASME-IMECE Hackathon	Virtual
2020	Scholarship , University of Illinois Chancellor's Scholar	Urbana, IL
2020	Scholarship, Edmund J. James Scholar	Urbana, IL
2020	Recipient, Kenneth J. Trigger Award	Urbana, IL
2020	Recipient , University of Illinois Dean's list (9x)	Urbana, IL
2019	Scholarship , Association for Facilities Engineering	Urbana, IL
2018	First Place, Association of Environmental Engineering & Science Professors Competition	Urbana, IL
2016	Honors , National Merit Scholar	Urbana, IL
2014	Qualifier , USA Junior Mathematical Olympiad	Urbana, IL

Skills_

Machine Learning	Generative Models, Supervised learning, Cross-val, AutoML, ML Explainability, Multimodal ML, ML fundamentals
Coding & Software	Python (2000+ hrs.), Matlab (100+ hrs.), C++ (30+ hrs.), C (10+ hrs.), Julia (10+ hrs.)
Modeling Software	PTC Creo (500+ hrs.), Solidworks (100+ hrs.), KiCAD (20+ hrs.)
Optimization	Heuristic (genetic algorithms, Particle Swarm, Simulated Annealing,), gradient-based (ML-based, Quasi-Newton)
Simulation	Solidworks CFD (20+ hrs.), Solidworks FEA (20+ hrs.), CREO FEA (10+ hrs.)
Electrical Skills	Printed circuit board design & soldering, sensing, power systems (basic), digital systems (basic)
Computing	Algorithms, parallel computing, numerical methods
Control Systems	Kalman filtering & sensor fusion, control principles, PID control
Machining	Additive manufacturing, lathe, mill, waterjet, press brake, CNC
Language	English (native speaker), German (advanced), Luxembourgish (beginner)
Communication	LaTeX (300+ hrs.), technical writing, research presentations (20+)

Reviewing

To date, I have reviewed for the following journals and conferences: Journal of Computational Design and Engineering (1x), Engineering Computations (1x), Design Science (1x), Discover Mechanical Engineering (1x), International Design Engineering Technical Conferences (7x), Ain Shams Engineering Journal (1x), Sports Engineering (1x).