DAVID REBER

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EXPERIENCE

Research Intern, Safety via Pessimistic RL Group *AISC (Feb 2021 – May 2021)*

- Explored theoretical extensions of Cohen/Hutter's pessimistic ask-for-help RL agent and coded practical demonstrations of pessimistic agents, under guidance of Michael Cohen
- Implemented fail-fast research strategy and keeping rest of team up to date, so we could pivot to each other's projects quickly if necessary while producing as many MVPs as possible in our 4-month window

Mentor of Intrinsic Stability Research Group *BYU (Apr 2020 – Dec 2020)*

- Directed 4 undergraduate mathematics students on applications and theoretical generalizations of dynamical networks
- Developed research agenda and actively assisted students, quickly pivoting as needed
- Brainstormed candidate stability criteria, developed statistically reliable tests in Python; then helped students revised criteria until numerically robust, and proved them analytically
- Of my 7 original research ideas, 2 succeeded (1 published), 3 failed, and 2 remain open

Machine Learning Engineer *Medic.Life (Oct 2018 – Apr 2020)*

- Self-directed researcher on 6 products, collaborating closely with ME, EE, and Business teams to design statistically sound experiments, fail fast and turn high-level ideas into working prototypes
- Health-monitoring toilet accessories ranged from physics-based spectroscopy of urine analyte quantities to infrared computer vision to identify vein-based medical anomalies
- Submitted 5 provisional patents, on 2 of which I was the original contributor
- Trusted with confidentiality of technical designs and significant business investments
- Persuaded supervisors of product-critical generalization failures and took steps to measure and mitigate using error modeling and manifold learning
- Spearheaded user privacy discussions, advocating data obfuscation and local differential learning
- Generated technical reports, presented research projects to high-profile potential investors, and was selected to present prototypes at the 2020 HIMSS Global Health Conference (before it was canceled)

"Early Alert" Project Manager *BYU (May 2018 – Aug 2018)*

- Tasked with developing an experimental real-time predictive academic counseling tool to be tested during the 2018 academic year
- Developed the financial and logistical plans, hired a team of qualified students, and shepherded the project to meet regular deadlines
- Strategized how to combine large, incongruous datasets and build efficient machine learning pipelines

- Regularly communicated with 6 diverse stakeholder groups within the university to personalize reporting to use cases, from untrained student mentors to counselors and administrators
- Supervised multiple revisions to minimize biases (gender, hometown, etc.), critique success metrics, highlight risks from misuse of the technology, and protect student confidentiality

EDUCATION

MS in Mathematics BYU (*graduated April 2019*)

BS in Applied & Computational Mathematics BYU (*graduated August 2017*)

Relevant Experience:

- Instructor: taught Competitive Coding (2016), which I persuaded the Mathematics Department to revive, and Quantitative Reasoning (2018); each class was about 40 students.
- Curriculum Developer: created for above courses and a new graduate-level Network Theory (2017); collaboratively developed ACME programming labs with a team of seven (2016–2017)
- Undergraduate Research: analyzed 3-body fractal chaos in astrophysics research group (2013); modeled inflatable robots as dynamical networks with mechanical engineers (2016–2018)

PUBLICATIONS AND PRESENTATIONS

Papers

- Camille Carter, Jacob Murri, David Reber and Benjamin Webb. "Stability of Stochastically Switched and Stochastically Time-Delayed Systems." arXiv abs/2012.06924, 2020. URL https://arxiv.org/abs/2012.06924
- David Reber and Benjamin Webb. Intrinsic Stability: Stability of Dynamical Networks and Switched Systems with any Type of Time-Delays. Nonlinearity 33(6): 2660-2685, 2020. URL https://iopscience.iop.org/article/10.1088/1361-6544/ab7728/pdf

Conferences

- David Reber and Benjamin Webb. Dynamical Stability despite Time-Varying Network Structure. MAA *Intermountain Section Conference*, 2018. https://math.usu.edu/maa/abstracts
- David Reber and Benjamin Webb. Dynamical Stability despite Time-Varying Network Structure. SIAM *Discrete Mathematics Conference*, 2018. https://archive.siam.org/meetings/dm18/dm18_program.pdf
- David Reber and Benjamin Webb. Dynamical Stability despite Time-Varying Network Structure. SIAM *Annual Meeting*, 2018. https://www.siam.org/conferences/cm/program/program-and-abstracts/an18-program-abstracts

INTERESTS AND HOBBIES

Norwegian | biking | cooking | Jukebox the Ghost | vermicomposting | zero-waste