John Thickstun

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Education

- **University of Washington** — Seattle, WA
  Ph.D. in Computer Science and Engineering — *August 2021*
  - Advised by Sham M. Kakade (joint Computer Science & Statistics) and Zaid Harchaoui (Statistics).
  - Doctoral Committee: Sham M. Kakade Zaid Harchaoui, Noah A. Smith, Sewoong Oh, Lalit Jain.
  - Dissertation: Leveraging Generative Models for Music and Signal Processing.
- **University of Washington** — Seattle, WA
  M.Sc. in Computer Science and Engineering — *December 2017*
  - Coursework in Optimization, Algorithms, Learning Theory, Information Theory, Reinforcement Learning.
- **Brown University** — Providence, RI
  Sc.B. Magna cum Laude with Honors in Applied Mathematics — *May 2013*
  - Advised by Björn Sandstede and Eugene Charniak.
  - Coursework in Machine Learning, Computer Vision, Natural Language Processsing, Probability Theory, Stochastic Processes, Real and Complex Analysis, Operator Theory.
  - Associate Member, Sigma Xi Scientific Honor Society.
- **Hamilton College Bridge Program** — Clinton, NY
  (High School Credit) — *2005-2007*
  - Coursework in Programming Languages, Computer Architecture, Operating Systems, Abstract Algebra.

Work Experience

- **Stanford University** — Palo Alto, CA
  Postdoctoral Scholar - Stanford Artificial Intelligence Laboratory — *September 2021 - Present*
  - Advised by Percy Liang (joint Computer Science & Statistics).
- **University of Washington** — Seattle, WA
  Ph.D. Candidate - Computer Science and Engineering — *September 2015 - August 2021*
  - Built a track-record of machine learning research with publications at ICML, ICLR, ICASSP, ISMIR.
  - Created the current best music transcription model in the MIREX Multi-F0 Challenge.
  - Designed, built, and administered a GPU computing cluster to support two research groups ($\sim$ 40 GPUs).
- **Amazon** — Seattle, WA
  Applied Science Intern - Amazon Music Machine Learning — *June 2019 – Aug. 2019*
  - Built a recommendation model using deep contextual bandits to sequence tracks on Amazon Music stations.
  - Used counterfactual risk minimization to train models off-policy from logged user interaction data.
- **Bracebridge Capital** - Fixed Income Arbitrage Hedge Fund — Boston, MA
  Quantitative Developer (Lead Developer) - Quantitative Research — *July. 2013 – May 2015*
  - Led and mentored a team of three software engineers developing C++ software infrastructure.
  - Maintained models governing a billion dollar asset backed structured product portfolio.
  - Architected front-office data acquisition, coordinating between research, vendors, the trading floor, and IT.
  - Built in-house models of implied volatilities and sensitivities, with applications to rates products.
- **Bracebridge Capital** — Boston, MA
  Summer Analyst - Quantitative Research — *June 2012 – Aug. 2012*
  - Rebuilt a legacy Excel product model using modern technologies: C#, Postgres, WCF, JavaScript.
  - Completed a quant training course on valuation and risk models, with a focus on fixed income products.

- **Sirius Software** - Database Vendor — Cambridge, MA
  Software Engineer - Systems Software Engineering — *Jan. 2008 – May 2012*
  - Built modern language features into the Model 204 database bytecode query language compiler.
  - Designed and implemented system libraries for reporting, parsing, and web-communication.
  - Linux systems administration: DNS, internal services, backups, software updates, security, documentation wiki.

Other Experience

- **Panjandrum.ai** - Virtual Avatar Music — Seattle, WA
  Advisor — *June 2020 - Present*
  - Provided advice and technical strategy for applications of machine learning to music and visual production.

Major Grants and Awards

- Qualcomm Innovation Fellowship: $100,000 (2020).
- NSF Graduate Research Fellowship: $138,000 (2017-2019).
- Brown University Distinguished Senior Thesis Award (university-wide award).

Teaching

- CSE599i: Generative Models (Autumn, 2020). Predoctoral Instructor (Instructor of Record).
  - Created a new course offering covering advances in generative modeling from 2010-2020.
  - Developed course materials from scratch including lecture notes, slides, and homework.
  - Received top-decile teaching reviews: 4.9/5.0 overall course quality with a 53% response rate (16/30 students).
- CSE547: Machine Learning for Big Data (Spring, 2016). Teaching Assistant.
- CSE546: Machine Learning (Autumn, 2015). Teaching Assistant.

Service

- Reviewer:
  - International Conference on Learning Representations 2022.
  - Transactions of the International Symposium on Music Information Retrieval 2021.
  - International Conference on Machine Learning 2018, 2021.
  - Advances in Neural Information Processing Systems 2016, 2020, 2021.
- Panelist:
  - June 2021: Howard University Karsh STEM Scholars Research Panel for Incoming First-Year Students
  - March 2021: UW CSE PhD Student Experience Panel for Admitted Graduate Students
  - February 2020: CSE 142 Careers in Research Panel for First-Year Computer Science Students
- UW CSE PhD Application Reader: 2018, 2019, 2020.
- UW ML Graduate Student Recruiting Activities Coordinator: 2018, 2019.
  - Planned and organized on-campus recruiting events and activities for prospective graduate students.
- UW CSE Graduate Social Co-Chair, 2017.
  - Organized weekly student social events for the Allen School graduate student community.
  - Worked to create inclusive activities that are accessible and appealing to our diverse community of students.
- Co-founder and organizer of the UW Machine Learning and Optimization Reading Group.
  - Organized and scheduled speakers for a weekly seminar for 5 years (2015-2019).
  - In 2020, this seminar became the regular meeting of ADSI/ IFDS, funded by an NSF Tripods grant.

Publications and Preprints

- *Reconstruction of Visual Images from Murine Retinal Ganglion Cell Spiking Activity using Convolutional Neural Networks.*
  Preprint Report, 2021.
  Tyler Benster, Darwin Babino, John Thickstun, Matthew Hunt, Xiyang Liu, Zaid Harchaoui, Sewoong Oh, Russell N. Van Gelder.
- *An Information Divergence Measure between Neural Text and Human Text.*
  Advances in Neural Information Processing Systems (Neurips) 2021.
  Krishna Pillutla, Swabha Swayamdipta, Rowan Zellers, John Thickstun, Sean Welleck, Yejin Choi, Zaid Harchaoui.
- *Parallel and Flexible Sampling from Autoregressive Models via Langevin Dynamics.*
  In International Conference on Machine Learning (ICML) 2021.
  Vivek Jayaram, John Thickstun (equal contribution).
- *Faster Policy Learning with Continuous-Time Gradients.*
  Learning for Dynamics & Control (L4DC) 2021.
  Samuel Ainsworth, Kendall Lowrey, John Thickstun, Zaid Harchaoui, Siddhartha Srinivasa.
- *Rethinking Evaluation Methodology for Audio to Score Alignment.*
  ArXiv Preprint Report 2009.14374, 2020.
  John Thickstun, Jennifer Brennan, Harsh Verma.
- *An Information Bottleneck Approach for Controlling Conciseness in Rationale Extraction.*
  Empirical Methods in Natural Language Processing (EMNLP) 2020.
  Bhargavi Paranjape, Mandar Joshi, John Thickstun, Hannaneh Hajishirzi, Luke Zettlemoyer.
- *Source Separation with Deep Generative Priors.*
  In International Conference on Machine Learning (ICML) 2020.
  Vivek Jayaram, John Thickstun (equal contribution).
- *Convolutional Composer Classification.*
  In International Symposium on Music Information Retrieval (ISMIR) 2019.
  Harsh Verma, John Thickstun.
- *Coupled Recurrent Models for Polyphonic Music Composition.*
  In International Symposium on Music Information Retrieval (ISMIR) 2019.
  John Thickstun, Zaid Harchaoui, Dean P. Foster, Sham M. Kakade.
- *Invariances and Data Augmentation for Supervised Music Transcription.*
  In International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2018.
  John Thickstun, Zaid Harchaoui, Dean P. Foster, Sham M. Kakade.
- *Frequency Domain Convolutions for Multiple F0 Estimation.*
  MIREX Abstract (Technical Report) 2017.
  John Thickstun, Zaid Harchaoui, Dean P. Foster, Sham M. Kakade.
- MusicNet: *Learning Features of Music from Scratch.*
  In International Conference on Learning Representations (ICLR) 2017.
  John Thickstun, Zaid Harchaoui, Sham M. Kakade.
- *Statistical Inference on Music with Applications to the Transcription Problem.*
  Brown University Senior Thesis, 2013.
  Supervisor: Dr. Eugene Charniak, Computer Science.
  Second Reader: Dr. Hui Wang, Applied Mathematics.

Invited Talks and Presentations

- Generative Modeling of Classical Western Music - SAIL - Stanford University (remote) - 12/4/2020
- Source Separation with Deep Generative Priors - ICML - Vienna, Austria (remote) - 7/14/2020
- Convolutional Composer Classification - ISMIR - Delft, Netherlands - 11/6/2019

- Autoregressive Modeling of Musical Scores - ISMIR - Delft, Netherlands - 11/5/2019
- Robust Generative Modeling in Generic Problem Domains - CSE Colloquium - UW Seattle - 10/31/2019
- Learning and Music - Deep Learning (Guest Lecture) - UW Seattle - 11/7/2018
- Neural Music Transcription - ICASSP - Calgary, Canada - 4/18/2018
- Practical Issues in Optimization and Learning - Machine Learning (Guest Lecture) - UW Seattle - 2/12/2018
- MusicNet: Learning Features of Music from Scratch - ICLR - Toulon, France - 4/25/2017
- Learning Mixtures of Gaussians - Machine Learning for Big Data (Guest Lecture) - UW Seattle - 4/26/2016
- Automatic Music Transcription - CS Department - Brown University - 5/1/2013
- Introducing the Janus XmlParser - Sirius User Group - St. Louis, Missouri - 5/2/2010
- Tokenization and Collection Objects - Centrelink - Canberra, Australia - 3/23/2010