

WAYNE CHI

waynchi@gmail.com

EDUCATION

Carnegie Mellon University *May 2028*
Ph.D. Computer Science
University of Southern California *December 2016*
M.S. Computer Science
University of Southern California *May 2016*
B.S. Computer Science & Business Administration

INDUSTRY EXPERIENCE

Amazon AI, Amazon Comprehend Medical *March 2021 - Present*
Applied Scientist II *Palo Alto, CA*

- Researched and developed named entity recognition (NER) and entity (ontology) linking models for clinical NLP.
- Improved our entity linking model's recall@1 by 16.3% (59.1% → 75.4%) through a two-stage deep metric learning approach.
- Decreased our entity linking model's latency by over 50% by applying clustering and efficient search through use of FAISS.
- Led and launched a critical terminology update for our SNOMED model and API.
- Redesigned core backend architecture responsible for orchestrating 12 different ML models. Enforced single responsibility, accelerated current and future model launches by two months, and decreased p50 latency by 33% and p90 latency by 66%.

Amazon AI, AWS DeepComposer *August 2019 - March 2021*
Software Development Engineer *Palo Alto, CA*

- Researched deep learning techniques for music generation, brought them into production, and helped launch three key product features.
- Developed a non-chronological, note-by-note music generation model that is trained to fix its own sampling mistakes. Our model beat Google's Bach Doodle in human evaluations.
- Li, Liang, **Wayne Chi**, Rahul Suresh, Dylan Jackson, and Haoting Li. "Music generation system." U.S. Patent 11,049,481, issued June 29, 2021.

NASA JPL, Artificial Intelligence Group *January 2017 - August 2019*
AI Researcher | Software Development Engineer *Pasadena, CA*

- Researched automated planning and scheduling (i.e. AI Planning) algorithms for the Mars 2020 Perseverance rover.
- Designed and characterized performance of onboard automation algorithms. Multiple algorithm designs have been baselined for Perseverance.
- Studied parameter optimization for scheduling and execution robustness. Used this research to develop *Copilot* which is now used in Perseverance operations.

NASA JPL *May 2016 - August 2016*
Software Engineering Intern *Pasadena, CA*

Cisco Systems *May 2015 - August 2015*
Software Engineering Intern *San Jose, CA*

REFEREED CONFERENCE AND JOURNAL PUBLICATIONS

- AAAI 2021 Symbolic Music Generation with Transformer-GANs
Aashiq Muhamed*, Liang Li*, Xingjian Shi, Suri Yaddanapudi, **Wayne Chi**, Dylan Jackson, Rahul Suresh, Zachary C. Lipton, Alexander J. Smola
In *Proceedings of the 35th AAAI Conference on Artificial Intelligence*
<https://ojs.aaai.org/index.php/AAAI/article/view/16117/15924>
- RAS 2021 Analyzing the Effectiveness of Rescheduling and Flexible Execution Methods to Address Uncertainty in Execution Duration for a Planetary Rover
Jagriti Agrawal, **Wayne Chi**, Gregg Rabideau, Daniel Gaines, Stephen Kuhn
In Journal: *Robotics and Autonomous Systems (Volume 140)*
<https://www.sciencedirect.com/science/article/abs/pii/S0921889021000439>
- ISMIR 2020 Generating Music with a Self-Correcting Non-Chronological Autoregressive Model
Wayne Chi*, Prachi Kumar*, Suri Yaddanapudi, Suresh Rahul, Umut Isik
In *Proceedings of the 21st International Society for Music Information Retrieval*
<https://arxiv.org/abs/2008.08927>
- ICAPS 2020 Scheduling with Complex Consumptive Resources for a Planetary Rover
Wayne Chi, Steve A. Chien, Jagriti Agrawal
In *Proceedings of the 30th International Conference on Automated Planning and Scheduling*
<https://ojs.aaai.org/index.php/ICAPS/article/view/6680>
- JAIS 2020 Automated Volcano Monitoring Using Multiple Space and Ground Sensors
Steve A. Chien, Ashley G. Davies, Joshua Doubleday, Daniel Q. Tran, David McLaren, **Wayne Chi**, Adrien Maillard
In *Journal of Aerospace Information Systems 17 (4), 214-228*
- ICAPS 2019 Optimizing Parameters for Uncertain Execution and Rescheduling Robustness
Wayne Chi, Jagriti Agrawal, Steve A. Chien, Elyse Fosse, Usha Guduri
In *Proceedings of the 29th International Conference on Automated Planning and Scheduling*
Selected for **ICAPS in Action Paper Highlight**
<https://ojs.aaai.org/index.php/ICAPS/article/view/3552/3430>
- ICAPS 2019 Temporal Brittleness Analysis of Task Networks for Planetary Rovers
Tiago Vaquero, Steve A. Chien, Jagriti Agrawal, **Wayne Chi**, Terrance Huntsberger
In *Proceedings of the 29th International Conference on Automated Planning and Scheduling*
<https://ojs.aaai.org/index.php/ICAPS/article/view/3553/3431>
- ICAPS 2018 Embedding a Scheduler in Execution for a Planetary Rover
Wayne Chi, Steve A. Chien, Jagriti Agrawal, Gregg Rabideau, Edward Benowitz, Daniel Gaines, Elyse Fosse, Stephen Kuhn, James Biehl
In *Proceedings of the 28th International Conference on Automated Planning and Scheduling*
https://ai.jpl.nasa.gov/public/documents/papers/chi_icaps2018_embedding.pdf

* Denotes Joint Authorship

WORKSHOP PAPERS AND PREPRINTS

- Creativity @NeurIPS 2020 Transformer-GAN: Symbolic music generation using a learned loss
Aashiq Muhamed*, Liang Li*, Xingjian Shi, Suri Yaddanapudi, **Wayne Chi**, Dylan Jackson, Rahul Suresh, Zachary C. Lipton, Alexander J. Smola
Appeared at *NeurIPS 2020 Machine Learning for Creativity and Design Workshop*
<https://drive.google.com/file/d/1UJIEcNNMkx9zLzGefoOsfogFpfY4vWAS/view>

- ML4MD Self-Correcting Non-Chronological Autoregressive Music Generation
 @ICML **Wayne Chi***, Prachi Kumar*, Suri Yaddanapudi, Suresh Rahul, Umut Isik
 2020 Appeared at *ICML 2020 Machine Learning for Media Discovery Workshop*
<https://drive.google.com/file/d/1lbyOX8hAnbkLsgLju6XDK6mRxuLRDiXR/view>
- PlanRob Using a Model of Scheduler Runtime to Improve the Effectiveness of Scheduling Em-
 @ICAPS bedded in Execution
 2020 Sarah Bhaskaran, Jagriti Agrawal, Steve A. Chien, **Wayne Chi**
 Appeared at *ICAPS 2020 Planning and Robotics Workshop*
https://ai.jpl.nasa.gov/public/documents/papers/Using_a_model_ICAPS2020_WS.pdf
- SPARK Enabling Limited Resource-Bounded Disjunction in Scheduling
 @ICAPS Jagriti Agrawal, **Wayne Chi**, Steve Chien, Gregg Rabideau, Stephen Khun, Daniel Gaines
 2019 Appeared at *ICAPS 2019 Scheduling and Planning Applications Workshop*
https://ai.jpl.nasa.gov/public/documents/papers/agrawal_iwpss2019_disjunction.pdf
- PlanRob Using Squeaky Wheel Optimization to Derive Problem Specific Control Information for
 @ICAPS a One Shot Scheduler for a Planetary Rover
 2018 **Wayne Chi**, Jagriti Agrawal, Steve Chien
 Appeared at *ICAPS 2018 Planning and Robotics Workshop*
https://ai.jpl.nasa.gov/public/documents/papers/chi_icaps2018_squeaky.pdf

CONFERENCE PRESENTATIONS AND INVITED TALKS

- CMU Computer Music Reading Group** *December 2020*
 Generating Music with a Self-Correcting Non-Chronological Autoregressive Model
- ISMIR 2020** *October 2020*
 Generating Music with a Self-Correcting Non-Chronological Autoregressive Model
- ML4MD@ICML 2020** *July 2020*
 Self-Correcting Non-Chronological Autoregressive Music Generation
- ICAPS 2019** *July 2019*
 Optimizing Parameters for Uncertain Execution and Rescheduling Robustness
- AAAI@USC** *October 2018*
 The Growing Role for Artificial Intelligence for Space Exploration and the Search
 for Life Beyond Earth (with Dr. Steve Chien)
- ICAPS 2018** *June 2018*
 Embedding a Scheduler in Execution for a Planetary Rover

HONORS, AWARDS, AND GRANTS

- Amazon Inventor Award** *2021*
 Awarded for a patent on music segmentation analysis
- JPL Data Science and Technology Research Grant (PI)** *2019*
 \$50,000 grant on improving Monte Carlo through Active Learning and Importance Sampling
- JPL Team Award** *2018*
- USC Presidential Scholarship (~4%)** *2012 - 2016*
- Viterbi Dean's List** *2012 - 2016*
- National Merit Scholarship** *2012 - 2016*
- Pell Grant** *2012 - 2016*

COMMUNITY SERVICE, TEACHING, AND MENTORSHIP

Reviewer Amazon Machine Learning Conference (AMLC) 2022 *July 2022*
Reviewer AAAI 2021 *October 2020*
Volunteer Citizen Schools *September 2020 - July 2021*
STEM outreach and mentorship for underserved communities
Mentor Amazon AI *August 2019 - March 2021*
Mentored junior scientists on research and engineering best practices.
Mentor NASA Jet Propulsion Laboratory *Summer 2017, Summer 2018, Summer 2019*
Mentored 2 undergraduate summer interns (one returning) through their summer research projects.
Teaching Assistant University of Southern California
CS103: Introduction to Programming *January 2014 - May 2014*
CS201: Principles of Software Development *August 2014 - May 2015*

TECHNICAL SKILLS

Fluent In Python, C++, Java, English, Mandarin
Familiar With C#, C, Objective-C, Bash
Frameworks PyTorch, Mxnet, GluonNLP, Keras, Tensorflow
Concepts Deep Learning, Machine Learning, Clinical NLP, Deep Generative Models, AI Planning, Object Oriented Design, Data Structures, Testing