Siddharth Jain **US Permanent Resident**

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WORK EXPERIENCE

Rockley Photonics *(Data Scientist)* *Feb 2022- present*
Caltech *(Guest Researcher)* *Nov 2021 - present*

Akuna Capital *(Quant)* *Aug 2021-Nov 2021*

Caltech *(Postdoc/Research Scientist, Electrical Engineering)* *July 2019 - July 2021*

EDUCATION

California Institute of Technology Advisor: Prof. Jehoshua Bruck
PhD, Electrical Engineering ; GPA 4.1/4 *Sept. 2013 - June 2019*
PhD Thesis Title: Decoding the Past (Evolutionary Past of DNA from its current snapshot)

Indian Institute of Technology Kanpur Advisor: Prof. R. K. Bansal
B. Tech and M. Tech in Electrical Engineering *2008 - 2013*
GPA: B. Tech 9.9/10, M. Tech 10/10

JOURNAL PUBLICATIONS

1. **Siddharth Jain**, Xiongye Xiao, Paul Bogdan, Jehoshua Bruck
Generator based approach to analyze mutations in genomic datasets.
Nature Scientific Reports, 11, Article number: 21084, 2021.
2. **Siddharth Jain**, Bijan Mazaheri, Netanel Raviv, Jehoshua Bruck
Glioblastoma signature in the DNA of blood-derived cells.
PLOS ONE, vol 16, no 9, September 2021.
3. **Siddharth Jain**, Farzad Farnoud, Jehoshua Bruck
Capacity and Expressiveness of Genomic Tandem Duplication.
IEEE Transactions on Information Theory, vol 63, no 10, pp. 1629-1638, October 2017.
4. **Siddharth Jain**, Farzad Farnoud, Moshe Schwartz, Jehoshua Bruck
Duplication Correcting Codes for Data Storage in the DNA of a living organism
IEEE Transactions on Information Theory, vol 63, no 8, pp. 4996-5010, August 2017.
5. Noga Alon*, Jehoshua Bruck*, Farzad Farnoud*, **Siddharth Jain***
Duplication Distance to the root for binary sequences.
IEEE Transactions on Information Theory, vol 63, no 12, pp. 7793-7803, December 2017 (*author list in alphabetical order).
6. **Siddharth Jain**, R. K. Bansal
On Match Lengths, Zero Entropy and Large Deviations - with Application to Sliding Window Lempel-Ziv Algorithm.
IEEE Transactions on Information Theory, vol. 61, no. 1, pp. 120-132, January 2015.
7. Paul Bogdan, **Siddharth Jain**, Radu Marculescu
Pacemaker Control of Heart Rate Variability: A CPS Perspective.
ACM Transactions on Embedded and Computing Systems (TECS), vol. 12, no. 1s, article 50, March 2013.
8. Paul Bogdan, Radu Marculescu, **Siddharth Jain**
Dynamic Power Management for Multi-domain Processor Systems-on-Chip Platforms: An Optimal Control Approach.

ACM Transactions on Design Automation of Electronic Systems (TODAES), vol. 18, no. 4, article 46, October 2013.

Conference Publications

1. Bijan Mazaheri, **Siddharth Jain**, Jehoshua Bruck
Synthesizing New Expertise via Collaboration
Proceedings of IEEE International Symposium on Information Theory (ISIT), July 2021, pp. 2447-2452.
2. Bijan Mazaheri, **Siddharth Jain**, Jehoshua Bruck
Robust Correction of Sampling Bias Using Cumulative Distribution Functions
NeurIPS 2020, pp. 3546-3556.
3. **Siddharth Jain**, Farzad Farnoud, Moshe Schwartz, Jehoshua Bruck
Coding for optimized writing rate in DNA Storage
Proceedings of IEEE International Symposium on Information Theory (ISIT) June 2020, pp. 711-716.
4. Netanel Raviv, **Siddharth Jain**, Jehoshua Bruck
What is the Value of Data?On Mathematical Methods for Data Quality Estimation
Proceedings of IEEE International Symposium on Information Theory (ISIT), June 2020, pp. 2825-2830.
5. Netanel Raviv, **Siddharth Jain**, Pulakesh Upadhyaya, Jehoshua Bruck, Anxiao Jiang
CodNN: Robust Neural Networks from Coded Classification
Proceedings of IEEE International Symposium on Information Theory (ISIT), June 2020, pp. 2688-2693.
6. Netanel Raviv, Pulakesh Upadhyaya, **Siddharth Jain**, Jehoshua Bruck, Anxiao Jiang
Coded Deep Neural Networks for Robust Neural Computation
accepted in NVMW 2020.
7. **Siddharth Jain**, Netanel Raviv, Jehoshua Bruck
Attaining the 2nd Chargaff Rule by Tandem Duplications
in Proceedings of IEEE International Symposium on Information Theory (ISIT), pp. 2241-2245, Vail, Colorado, June 2018.
8. **Siddharth Jain**, F. Farnoud, M. Schwartz, J. Bruck
Noise and Uncertainty in String-Duplication Systems
in Proceedings of IEEE International Symposium on Information Theory (ISIT), pp. 3120-3124, Aachen, Germany, June 2017.
9. **Siddharth Jain**, F. Farnoud, M. Schwartz, J. Bruck
Duplication Correcting Codes for data storage in DNA of living organism
in Proceedings of IEEE International Symposium on Information Theory (ISIT), pp. 1028-1032, Barcelona, Spain, July 2016.
10. Noga Alon*, J. Bruck*, F. Farnoud*, **Siddharth Jain***
On the Duplication Distance of Binary Strings
in Proceedings of IEEE International Symposium on Information Theory (ISIT), pp. 260-264, Barcelona, Spain, July 2016 (*author list in alphabetical order).
11. **Siddharth Jain**, F. Farnoud, J. Bruck
Capacity and Expressiveness of Genomic Tandem Duplication.
in Proceedings of 2015 IEEE International Symposium on Information Theory (ISIT), pp. 1946-1950, Hong Kong, July 2015.
12. **Siddharth Jain**, R. K. Bansal
On Match Lengths and Asymptotic Behavior of Sliding Window Lempel-Ziv Algorithm for Zero Entropy Sequences.
IEEE International Symposium on Information Theory (ISIT), pp. 2885-2889, Istanbul, Turkey, Jul 2013.

13. **Siddharth Jain**, R. K. Bansal
On Large Deviation Property of Recurrence Times.
IEEE International Symposium on Information Theory (ISIT), pp. 2880-2884, Istanbul, Turkey, Jul 2013.

14. Paul Bogdan, Radu Marculescu, **Siddharth Jain**, Rafael Tornero
Optimal Power Management of Multidomain Multiprocessor Platforms under Highly Variable Workloads.
Proceedings of the 6th ACM/IEEE International Symposium on Networks-on- Chip (NOCS), pp. 35-42, Copenhagen, Denmark, May 2012 (**Best Paper Award**).

15. Paul Bogdan, **Siddharth Jain**, Kartikeya Goyal, Radu Marculescu
Implantable Pacemakers Control and Optimization via Fractional Calculus Approaches: A Cyber-Physical Systems Perspective.
Proceedings of the ACM/IEEE 3rd International Conference on Cyber-Physical Systems (IC-CPS), pp. 23-32, Beijing, China, April 2012.

Preprints

1. Bijan Mazaheri, **Siddharth Jain**, Jehoshua Bruck
Expert Graphs: Synthesizing new expertise via collaboration, arXiv: 2107.07054, 2021.
2. **Siddharth Jain**, Xiongye Xiao, Paul Bogdan, Jehoshua Bruck
Predicting the Emergence of SARS-CoV-2 Clades, BiorXiv:2020.07.26.222117, 2020.
3. **Siddharth Jain**, Bijan Mazaheri, Netanel Raviv, Jehoshua Bruck
Short Tandem Repeats Information in TCGA is Statistically Biased by Amplification, BiorXiv:518878, 2019.

Patents

1. **Siddharth Jain**, Bijan Mazaheri, Netanel Raviv, Jehoshua Bruck
Mutation Profile and related labeled Genomic Components, Methods and Systems
December 2019, US Patent App. 16/447,162.
2. Netanel Raviv, Jehoshua Bruck, **Siddharth Jain**, Anxiao Jiang, Pulakesh Upadhyaya
Secure and private neural computation with error correcting codes
2021, US Patent App. 17/084,627.

Professional Activities

Reviewer for

- IEEE Transactions on Information Theory.
- IEEE Communication Letters.
- ACM Transactions on Algorithms.
- AAAS Science Advances.
- International Symposium on Information Theory (ISIT).
- Advances in Neural Information Processing Systems (NeurIPS).
- Uncertainty in Artificial Intelligence (UAI).
- Frontiers in Physiology.

Mentorship

1. Bijan Mazaheri - 5th year CMS PhD student at Caltech.
2. Xiongye Xiao - 3rd year ECE PhD student at USC.

Teaching Responsibilities

1. Head TA for IST4 (Spring 2015, 2016, 2017, 2018, 2019)
   - An Information and Logic class offered to undergraduates at Caltech by Prof. Shuki Bruck
2. TA for EE111 (Fall 2018)
   - Signal Processing class offered to undergraduates at Caltech by Prof. P. P. Vaidyanathan
3. TA for EE621 (Aug 2012 - Nov 2012)
   - Stochastic Processes and Measure Theory class offered to graduate students at IIT Kanpur by Prof. R. K. Bansal

Academic Achievements

- Selected for giving **Graduation Day Talk at Information Theory and Applications** meeting in San Diego in 2019 amongst all CS and EE graduate students at Caltech.
- **General Proficiency Medal** for the best academic performance in EE department at IIT Kanpur.
- **Best paper award** at 6th ACM/IEEE International Symposium on Networks-on-Chip (NOCS), 2012.
- **Academic Excellence Award** (awarded to top 5% undergraduates) for all the academic years at IIT Kanpur. (2008-2012)

Relevant Courses

Statistical Inference, Information Theory, Learning Systems, Machine Learning and Data Mining, Probability and Statistics, Error Correcting Codes, Theory of Computation, Data Structures and Algorithms, Randomized Algorithms, Digital Signal Processing, Stochastic Processes, Markov Chains, Real and Complex Analysis, Differential Equations, Control System Analysis, Linear Estimation, Combinatorics.

Technical Skills

Python, C++, Matlab
Machine Learning Libraries: xgboost, sklearn, tensorflow

Other Responsibilities

1. Treasurer of the Caltech Cricket Club (Sept 2015-2019) and the Indian Subcontinent Organization at Caltech (Sept 2014-Aug 2015)
2. Link Student, Counselling Service, IIT Kanpur - Helping underperforming students with their academics at IIT Kanpur.
3. Mentor at National Service Scheme (NSS), India - Tutoring 6th-8th grade students in villages of India.