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Justin Singh Kang

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Education

Ph.D. in Electrical Engineering and Computer Science, *The University of California, Berkeley*. Aug 2021 — Present
Advisor: Kannan Ramchandran. GPA: 4.0

M.A.Sc. in Electrical and Computer Engineering, *The University of Toronto*. Sept 2019 — Aug 2021
Advisor: Wei Yu. GPA: 4.0. Thesis: Scheduling for Massive Random Access.

B.A.Sc. in Engineering Physics *The University of British Columbia*. Sept. 2014 — Aug. 2019
Graduated with distinction and cooperative program certificate. GPA: 91.1%

Skills

Tools and Languages Python, Git, LaTeX, MATLAB, SystemVerilog, UVM
Quantitative Research Convex Optimization, Information Theory, Differential Privacy, Machine Learning

Publications, Preprints and Patents

The Fair Value of Private Data Under Heterogeneous Privacy Constraints
Justin Singh Kang, Ramtin Pedarsani and Kannan Ramchandran. Submitted, Oct. 2022.

Scheduling Versus Contention for Massive Random Access in Massive MIMO Systems
Justin Singh Kang and Wei Yu. IEEE Transactions on Communications, Sept. 2022. Presented in part at SPAWC Talks, 2021.

Minimum Feedback for Collision-Free Scheduling in Massive Random Access
Justin Singh Kang and Wei Yu. IEEE Transactions on Information Theory, Dec. 2021. Presented in part at ISIT, 2020.
This and the above work were presented together at the 2021 IEEE North American Information Theory School.

Techniques to use intrinsic information for a bit-flipping error correction control decoder
Aman Bhatia, Zion S. Kwok, **Justin Singh Kang**, Poovaiah M Palangappa, Santhosh Kumar Vanaparthy. US Patent 11,146,289, Granted Oct. 2021.

Work Experience

Research and Development Engineering Intern **May 2017 — Aug 2018**
Intel Corporation *Vancouver, Canada*

- Design and optimization of BCH decoders. Timing analysis, improving parallelism, making use of algebraic identities to reduce area and power, while improving throughput.
- Verification of designs using the Universal Verification Methodology. Test bench design for hierarchical reuse.
- Novel augmentations to belief propagation algorithms for high-throughput, low code-rate LDPC decoders, enabling next generation of NAND memories at higher bit error rates.
- Research and prototyping of architectures for low cost and low power optical networking devices. Proposed multiple parallel message passing algorithms with differing levels of message complexity to optimize decoder for logic area and throughput.
- Developing novel decoding algorithms to take advantage of knowledge of expected failure mechanisms derived from experimental analysis of Intel Optane storage.

VoIP Verification Intern **Jan 2016 — Apr 2016**
Broadcom Limited *Richmond, Canada*

- Developed remotely executable scripts to run on severs in python and bash.
- Managed lab environment, including IP routing tables, SIP servers, gateway hardware, sever switches, and OLT for PON systems.
- Extensively used Wireshark to troubleshoot and identify bugs in packet delivery and routing.

Other Projects

Fitness Tracking Using Machine Vision **Jan 2018 — Apr 2019**

- Training an artificial neural network model to classify with 30+ hours of video to classify 11 different exercises.
- Applying statistical tools such as principal component analysis and Fourier transforms to count repetitions.

Awards

Berkeley Graduate Fellowship Fall 2021
NSERC Canadian Graduate Scholarship - Doctoral/Masters Fall 2020/2021
Bycast Award For Entrepreneurship Fall 2018
Donald J. Evans Scholarship in Engineering Fall 2017/2018