John R. Emmons

Curriculum vitae
November 10, 2016

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Education

PhD Computer Science, Stanford University 2016 -
MS Computer Science (with certificate in machine learning), Washington University 2014 - 2016
BS Computer Engineering and BS Electrical Engineering, Washington University 2014 - 2016
BS Computer Science, Physics, and Mathematics (triple major), Drake University 2011 - 2014

Research Experience

Stanford University 2016 -
Rotation advisor: Peter Bailis
- Topic area: computer vision and large scale systems

Washington University 2015 - 2016
Advisor: Jeremy Buhler
- Implemented an expectation maximization (EM) based motif finding algorithm
- Ported CPU implementation to Nvidia GPUs (CUDA, C/C++, Cub)

California Institute of Technology 2015
Advisor: Oscar Bruno
- Simulated EM-fields propagating along dielectric waveguides with arbitrary shape
- Developed a generic, high-order numerical method for these simulations (Matlab, Fortran)

Carnegie Mellon University 2014
Advisor: Onur Mutlu
- Implemented generic, SMID-parallel DNA sequence alignment filter using Intel SSE3
- Achieved a 3x speedup over the best previous algorithm using bit-vector approach (C, SSE3)

Drake University 2013 - 2014
Advisor: Klaus Bartschat
- Simulated ultrafast, high-intensity laser pulses (attosecond timescale) on hydrogen atoms
- Parallelized simulations to run on the TACC Stampede supercomputer (Fortran, MPI, OpenMP)

University of California, Berkeley 2013
Advisor: Allison Andrews
- Implemented a massively scalable file system backup algorithm at NERSC
- Used Apache Hadoop to perform distributed computing on a supercomptuer (Hadoop, Python)

Professional Experience

Summer research and development intern, Honeywell 2016
Advisor: Soumitri Kolavennu
- Developed voice recognition engine for detecting phrases from a small grammar
- Deployed an AWS cloud infastructure to connect voice engine to IOT devices
- Used IFTTT to trigger actions for commands spoken to the system (AWS, C#, .NET, MongoDB)

Teaching Experience

Teaching Assistant (ESE 351), Washington University	2015
Teaching Assistant (CSE 341), Washington University	2014

Grants and Fellowships

NSF Graduate Student Research Fellowship (GRSF)	2016
Washington University Harold Brown Fellowship (full-tuition scholarship)	2014
Drake University Physics Prize (full-tuition scholarship)	2011

Awards and Honors

Washington University Ernest Weiss top senior award for computer science/engineering ($500)	2016
Washington University David Levy top senior award for electrical engineering ($500)	2016
Upsilon Pi Epsilon Executive Scholarship ($2,500)	2015
Drake Outstanding Mathematics Student	2014
Drake DUCURS Best Oral Presentation	2014
ACM Richard Tapia Scholarship ($1,000)	2013
Barry Goldwater Scholarship ($15,000)	2013
Drake STAR Award ($2,000)	2012

Professional Memberships/Affiliations

Tau Beta Pi (TBP)	2015
Eta Kappa Nu (HKN)	2015
Upsilon Pi Epsilon (UPE)	2014
Institute of Electrical and Electronics Engineers (IEEE)	2014
Association for Computing Machinery (ACM)	2013
American Physical Society (APS)	2013

Conference Activity/Participation

ACM Richard Tapia Celebration of Diversity in Computing Conference	2014
Midwest Instruction and Computing Symposium (MICS)	2013
Drake University Conference on Undergraduate Research in the Sciences (DUCURS)	2014
Frontiers in Optics: 97th OSA/APS Annual Meeting	2013
Midwest Instruction and Computing Symposium (MICS)	2013
Drake University Conference on Undergraduate Research in the Sciences (DUCURS)	2013
Great Plains Regional Annual Symposium On Protein & Biomolecular NMR (GRASP)	2012

References

Jeremy Buhler
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Publications

[1] H. Xin, S. Nahar, R. Zhu, J. Emmons, G. Pekhimenko, C. Kingsford, C. Alkan, and O. Mutlu, "Optimal Seed Solver: Optimizing Seed Selection in Read Mapping," *Oxford bioinformatics*, Nov. 2015, [pdf].

[2] H. Xin, J. Greth, J. Emmons, G. Pekhimenko, C. Kingsford, C. Alkan, and O. Mutlu, "Shifted Hamming Distance: A Fast and Accurate SIMD-Friendly Filter for Local Alignment in Read Mapping," *Oxford bioinformatics*, Dec. 2014, [pdf].

[3] I. A. Ivanov, A. S. Kheifets, K. Bartschat, J. Emmons, S. M. Buczek, E. V. Gryzlova, and A. N. Grum-Grzhimailo, "Displacement effect in strong-field atomic ionization by an XUV pulse," *Physical review a*, Oct. 2014, [pdf].

[4] J. Venzke, P. Johnson, R. Davis, J. Emmons, K. Roth, D. Mascharka, L. Robinson, T. Urness, and A. Kilpatrick, "Accelerating Biomolecular Nuclear Magnetic Resonance Assignment with A*," Madison, Wisconsin: Midwest Instruction and Computing Symposium (MICS), Apr. 2014.

[5] J. Emmons, K. Powell, M. Andrews, and J. Hick, "Parallel Graph Reduce Algorithm for Scalable File System Structure Determination," Feb. 2014.

[6] J. Emmons, A. Howes, A. Kramer, K. Bartschat, and J. Grout, "Parallelizable Algorithms for Describing the Effects of Strong Time-Dependent Electromagnetic Fields on the Hydrogen Atom," Oct. 2013.

[7] J. Emmons, S. Johnson, T. Urness, and A. Kilpatrick, "Automated Assignment of Backbone NMR Data using Artificial Intelligence," La Crosse, Wisconsin: Midwest Instruction and Computing Symposium (MICS), Apr. 2013.

[8] J. Emmons and A. Kilpatrick, "Structural Studies of a Calmodulin Mutant with Defective Regulation of Muscle Contraction," Nov. 2012.