

## CHRISTOPHER DE SA

Gates Hall 450, 107 Hoy Rd, Ithaca, NY 14853

(520) 425-5828

[cdesa@cs.cornell.edu](mailto:cdesa@cs.cornell.edu)

<https://www.cs.cornell.edu/~cdesa/>

### RESEARCH INTERESTS

My research interests include algorithmic, software, and hardware techniques for high-performance data analytics, with a focus on fast parallel variants of stochastic algorithms such as stochastic gradient descent (SGD) and Gibbs sampling. I am also interested in using these techniques to construct data analytics and machine learning frameworks, including for deep learning, that are efficient, parallel, and distributed.

### APPOINTMENTS

**Assistant Professor, Department of Computer Science, Cornell University, 2017–**

### EDUCATION

**Stanford University, Stanford California**

Ph.D. in Electrical Engineering, 2017

*Thesis: Fast Stochastic Algorithms for Machine Learning*

*Advisors: Professors Kunle Olukotun and Christopher Ré*

M.S. in Electrical Engineering, 2011

B.S. in Electrical Engineering, 2011, with Distinction

### AWARDS & FELLOWSHIPS

**ICML Best Paper Award, 2016**

*Awarded for the paper “Ensuring Rapid Mixing and Low Bias for Asynchronous Gibbs Sampling.”*

**Stanford Graduate Fellowship, Stanford University, 2013–2015**

*Awarded to outstanding doctoral students in science and engineering*

**Numerical Technologies Co-Founders Fellowship, Stanford University, 2012–2013**

*Awarded to the top scorer on the Stanford EE Qualifying Exam*

### PUBLICATIONS

Christopher De Sa, Ihab F. Ilyas, Benny Kimelfeld, Christopher Ré, Theodoros Rekatsinas. “A Formal Framework for Probabilistic Unclean Databases.” ICDT 2019 (to appear).

Ilse Van Meerbeek, Christopher De Sa, Robert Shepherd. Soft optoelectronic sensory foams with proprioception. *Science Robotics*. 2018.

Christopher De Sa, Vincent Chen, Wing Wong. “Minibatch Gibbs Sampling on Large Graphical Models.” ICML 2018.

Frederic Sala, Chris De Sa, Albert Gu, Christopher Ré. “Representation Tradeoffs for Hyperbolic Embeddings.” ICML 2018.

Dan Alistarh, Christopher De Sa, Nikola Konstantinov. “The Convergence of Stochastic Gradient Descent in Asynchronous Shared Memory.” PODC 2018.

Christopher De Sa, Bryan He, Ioannis Mitliagkas, Christopher Ré, Peng Xu. “Accelerated Stochastic Power Iteration.” AISTATS 2018.

Christopher De Sa, Albert Gu, Rohan Puttagunta, Christopher Ré, and Atri Rudra. “A Two Pronged Progress in Structured Dense Matrix Multiplication.” SODA 2018

Tri Dao, Christopher De Sa, and Christopher Ré. “Gaussian Quadrature for Kernel Features.” NIPS 2017. *Spotlight*.

Christopher De Sa, Kunle Olukotun, and Christopher Ré. “Ensuring Rapid Mixing and Low Bias for Asynchronous Gibbs Sampling.” IJCAI 2017 *Best Sister Conferences Track*.

Christopher De Sa, Matthew Feldman, Christopher Ré, and Kunle Olukotun. “Understanding and Optimizing Asynchronous Low-Precision Stochastic Gradient Descent.” ISCA 2017.

Paroma Varma, Dan Iter, Christopher De Sa and Christopher Ré. “Flipper: A Systematic Approach to Debugging Training Sets.” HILDA 2017

Alex Ratner, Christopher De Sa, Sen Wu, Daniel Selsam, and Christopher Ré. “Data Programming: Creating Large Training Sets, Quickly.” NIPS, 2016

Bryan He, Christopher De Sa, Ioannis Mitliagkas, and Christopher Ré. “Scan Order in Gibbs Sampling: Models in Which it Matters and Bounds on How Much.” NIPS, 2016

Paroma Varma, Rose Yu, Dan Iter, Christopher De Sa, Christopher Ré. “Socratic Learning: Empowering the Generative Model.” FiLM-NIPS, 2016

Christopher De Sa, Kunle Olukotun, and Christopher Ré. “Ensuring Rapid Mixing and Low Bias for Asynchronous Gibbs Sampling.” ICML 2016. *Best paper award.*

Jian Zhang, Christopher De Sa, Ioannis Mitliagkas, and Christopher Ré. “Parallel SGD: When does Averaging Help?” OptML workshop at ICML, 2016.

Christopher De Sa, Alex Ratner, Christopher Ré, Jaeho Shin, Feiran Wang, Sen Wu, and Ce Zhang. “DeepDive: Declarative Knowledge Base Construction.” Research highlight in *SIGMOD* Record, April 2016.

Raghu Prabhakar, David Koeplinger, Kevin J. Brown, HyoukJoong Lee, Christopher De Sa, Christos Kozyrakis, and Kunle Olukotun. “Generating Configurable Hardware from Parallel Patterns.” ASPLOS 2016.

Kevin J. Brown, HyoukJoong Lee, Tiark Rompf, Arvind K. Sajeeth, Christopher De Sa, Christopher Aberger, and Kunle Olukotun. “Have Abstraction and Eat Performance, Too: Optimized Heterogeneous Computing with Parallel Patterns.” CGO 2016.

Christopher De Sa, Ce Zhang, Kunle Olukotun, and Christopher Ré. “Rapidly Mixing Gibbs Sampling for a Class of Factor Graphs Using Hierarchy Width.” NIPS 2015. *Spotlight.*

Christopher De Sa, Ce Zhang, Kunle Olukotun, and Christopher Ré. “Taming the Wild: A Unified Analysis of Hogwild!-Style Algorithms.” NIPS 2015.

Jaeho Shin, Sen Wu, Feiran Wang, Ce Zhang, Christopher De Sa, and Christopher Ré. “Incremental Knowledge Base Construction Using DeepDive.” VLDB 2015. *Best of issue award.*

Christopher De Sa, Kunle Olukotun, and Christopher Ré. “Global convergence of stochastic gradient descent for some non-convex matrix problems.” ICML 2015.

## TALKS

ISCA 2017 — Workshop on Architecture for Graph Processing

STOC 2017 — Plenary Talk

STOC 2017 — Workshop on New Challenges in Machine Learning

## TEACHING EXPERIENCE

*Instructor for CS 4780 – Machine Learning for Intelligent Systems – Cornell – 2018*

*Instructor for CS 4787 – Principles of Large-Scale ML Systems – Cornell – 2019*

*Instructor for CS 6787 – Advanced Machine Learning Systems – Cornell – 2017-2018*

## SERVICE

*Reviewer:* NeurIPS, IEEE Micro, JASA, FOCS, JMLR, IBM AI Systems Day, AAI, AISTATS, SIGMOD, VLDB

*Program Committee:* SysML 2019, SysML 2018, ICML 2019, Eurosys 2019

*PhD Admissions Committee:* Cornell Computer Science — 2018, 2019