

# Stanford

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## Fredrik Kjolstad

Assistant Professor of Computer Science

### Bio

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#### BIO

Fredrik Kjolstad is an assistant professor at Stanford University and works on topics in compilers and programming models. He is particularly interested in how we can build programming systems for sparse computing applications, for example in data analytics, computational engineering, and science. He received his PhD from MIT, his master's degree from the University of Illinois at Urbana-Champaign, and his bachelor's degree from the Norwegian University of Science and Technology in Gjøvik.

Website: <https://fredrikbk.com/>

#### ACADEMIC APPOINTMENTS

- Assistant Professor, Computer Science

#### HONORS AND AWARDS

- NSF CAREER Award, NSF (2022)
- Google Research Scholar, Google (2021)
- First Place MIT EECS George M. Sprowls PhD Thesis Award in Computer Science, MIT EECS (2020)
- Robert N. Noyce Faculty Fellow, Stanford University School of Engineering (2020)
- Adobe Fellowship, Adobe (2016)
- Rosing Award for best Norwegian IT-related student work., The Norwegian Computer Society (2006)

#### LINKS

- Academic website: <https://fredrikbk.com/>
- Google Scholar: <https://scholar.google.com/citations?user=bCCxZ28AAAAJ&hl=en&oi=ao>

### Teaching

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#### COURSES

##### 2021-22

- Compilers: CS 143 (Spr)
- Domain-Specific Programming Models and Compilers: CS 343D (Aut)

##### 2020-21

- Compilers: CS 143 (Spr)

- Departmental Lecture Series: CS 300 (Aut)
- Domain-Specific Programming Models and Compilers: CS 343D (Aut)

#### 2019-20

- Compilers: CS 143 (Spr)

### STANFORD ADVISEES

#### Doctoral Dissertation Reader (AC)

Kalhan Koul, Wonyeol Lee, Qiaoyi(Joey) Liu, Alex Rucker, Jeff Setter

#### Doctoral Dissertation Co-Advisor (AC)

Olivia Hsu, Rohan Yadav

#### Master's Program Advisor

Anh Nguyen, Matthew Russo

#### Doctoral (Program)

James Dong, Scott Kovach, Shiv Sundram, Haoran Xu, Bobby Yan

## Publications

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### PUBLICATIONS

- **Compilation of Sparse Array Programming Models** *PROCEEDINGS OF THE ACM ON PROGRAMMING LANGUAGES-PACMPL*  
Henry, R., Hsu, O., Yadav, R., Chou, S., Olukotun, K., Amarasinghe, S., Kjolstad, F.  
2021; 5
- **Copy-and-Patch Compilation A Fast Compilation Algorithm for High-Level Languages and Bytecode** *PROCEEDINGS OF THE ACM ON PROGRAMMING LANGUAGES-PACMPL*  
Xu, H., Kjolstad, F.  
2021; 5
- **A Sparse Iteration Space Transformation Framework for Sparse Tensor Algebra** *Proceedings of the ACM on Programming Languages*  
Senanayake, R., Hong, C., Wang, Z., Wilson, A., Chou, S., Kamil, S., Amarasinghe, S., Kjolstad, F.  
2020; 4 (OOPSLA): 30
- **Automatic Generation of Efficient Sparse Tensor Format Conversion Routines** *Proceedings of the 41st ACM SIGPLAN Conference on Programming Language Design and Implementation*  
Chou, S., Kjolstad, F., Amarasinghe, S.  
2020: 16
- **Sparse Tensor Transpositions** *Proceedings of the 32nd ACM Symposium on Parallelism in Algorithms and Architectures*  
Mueller, S., Ahrens, P., Chou, S., Kjolstad, F., Amarasinghe, S.  
2020: 3
- **Creating an Agile Hardware Design Flow** *2020 57th ACM/IEEE Design Automation Conference (DAC)*  
Bahr, R., Barrett, C., Bhagdikar, N., Carsello, A., Daly, R., Donovick, C., Durst, D., Fatahalian, K., Feng, K., Hanrahan, P., Hofstee, T., Horowitz, M., Huff, et al  
2020
- **Tensor Algebra Compilation with Workspaces** *Proceedings of the 2019 IEEE/ACM International Symposium on Code Generation and Optimization*  
Kjolstad, F., Ahrens, P., Kamil, S., Amarasinghe, S.  
2019: 13
- **Format Abstraction for Sparse Tensor Algebra Compilers** *Proceedings of the ACM on Programming Languages*  
Chou, S., Kjolstad, F., Amarasinghe, S.  
2018; 2 (OOPSLA): 30

- **The Tensor Algebra Compiler** *Proceedings of the ACM on Programming Languages*  
Kjolstad, F., Kamil, S., Chou, S., Lugato, D., Amarasinghe, S.  
2017; 1 (OOPSLA): 29
- **Simit: A Language for Physical Simulation** *ACM TRANSACTIONS ON GRAPHICS*  
Kjolstad, F., Kamil, S., Ragan-Kelley, J., Levin, D. I., Sueda, S., Chen, D., Vouga, E., Kaufman, D. M., Kanwar, G., Matusik, W., Amarasinghe, S.  
2016; 35 (2)
- **Why New Programming Languages for Simulation?** *ACM TRANSACTIONS ON GRAPHICS*  
Bernstein, G. L., Kjolstad, F.  
2016; 35 (2)
- **MPI Datatype Processing using Runtime Compilation** *Proceedings of the 20th European MPI Users' Group Meeting*  
Schneider, T., Kjolstad, F., Hoefler, T.  
2013: 6
- **Automatic Datatype Generation and Optimization**  
Kjolstad, F., Hoefler, T., Snir, M.  
ASSOC COMPUTING MACHINERY.2012: 327–28
- **Transformation for Class Immutability** *33rd International Conference on Software Engineering*  
Kjolstad, F., Dig, D., Acevedo, G., Snir, M.  
2011
- **Ghost Cell Pattern** *Proceedings of the 2010 Workshop on Parallel Programming Patterns*  
Kjolstad, F., Snir, M.  
2010: 9