

Exhibit A

IAN FOSTER

NARRATIVE

I am a computer scientist whose work at the intersection of computing and the sciences has produced both practical technologies that have seen wide adoption and concepts and methods that have proven influential in research and education. My research interests span a range of topics in parallel, distributed, and data-intensive computing. A unifying theme is a desire to use the power of rapid communication to accelerate discovery, whether by linking people with remote computers and data, accelerating complex computational processes, or enabling distributed virtual teams. I pursue use-inspired basic research, meaning that I employ challenging practical problems to motivate and focus work on hard problems in computer science. Over the years, these practical problems have come from such fields as environmental science, economics, high-energy physics, biomedicine, and engineering. I often build sophisticated artifacts (software and distributed systems) in order to apply, evaluate, and disseminate new concepts and methods. Thus, my work frequently requires large teams of disciplinary scholars, computer scientists, and software engineers.

EDUCATION

1985 - 1988 Imperial College London, United Kingdom
PhD, Computer Science and Diploma of Imperial College

1977 - 1979 University of Canterbury Christchurch, New Zealand
B.Sc (Hons I), Computer Science

PROFESSIONAL EXPERIENCE

2006 - Argonne National Laboratory Argonne, IL
The University of Chicago Chicago, IL

Director, Computation Institute (CI), Argonne Distinguished Fellow, Arthur Holly Compton Distinguished Service Professor of Computer Science

[Previously Asst. Scientist 1989-1992, Scientist 1992-1997, Senior Scientist 1997-2008, Math & Computer Science Division, Argonne, Assoc. Professor 1996-2000, Professor 2000-2006, Dept of Computer Science, University of Chicago]

- Lead the Computation Institute, a cross-institutional, multi-disciplinary research institute with 100 Fellows, 80 staff, many postdocs and students, and an annual budget of ~\$20M
- Conduct research in distributed, parallel, and data-intensive computing, and publish technical articles that have seen more than 50,000 citations, yielding an h index of 90*
- Pioneer new technologies that have seen wide adoption, including grid computing (technologies, infrastructures, and applications), parallel climate models (e.g., Parallel Climate Model), and parallel programming languages (e.g., Swift)
- Establish and manage major computer science and computational science projects, including Earth System Grid, Grid Physics Network, International Virtual Data Grid Laboratory, Open Science Grid, TeraGrid, Center for Enabling Distributed Petascale Science, and Center for Robust

* H-index is a commonly used measure of scientific impact. According to <http://www.cs.ucla.edu/~palsberg/h-number.html>, mine is the fourth highest of any computer scientist in 2010.

Decisions on Climate and Energy Policy

- Lead the establishment of the international Globus Alliance open source community, and the development of the Globus Toolkit, from inception to its adoption by a broad spectrum of national and international projects
- Establish the Open Grid Forum, and play a leadership role in various other national and international projects and organizations
- Serve on national and international advisory committees, including the US Ocean Observatory Initiative and UK eScience Program
- Supervise the work of research staff and graduate students
- Teach graduate and undergraduate classes in computer science

1985 - 1998 Imperial College London, U.K.

Research Associate, Department of Computing

- Conduct research in concurrent logic programming systems
- Develop programming language technology, commercialized as Strand

OTHER PROFESSIONAL EXPERIENCE

Founder, Board Member, Chief Open Source Strategist, Univa Corporation

Technical Advisory Board, EMC Corporation (2010-), IOCOM Corporation (2005-), Entropia (2000-2004)

PUBLICATIONS AND PRESENTATIONS

More than 300 article and technical reports, and six books, in distributed and parallel computing, computational science, and programming languages. More than 100 keynote talks and seminars worldwide.

The Grid: Blueprint for a New Computing Infrastructure, I. Foster and C. Kesselman (Eds), Morgan-Kaufmann, 1999 and 2003 (2nd edition).

Designing and Building Parallel Programs: Concepts and Tools for Parallel Software Engineering, I. Foster, Addison-Wesley, 1995.

SELECTED RECOGNITION

D.Sc. (Honoris Causa), CINVESTAV, Mexico, 2010; Fellow, Association for Computing Machinery, 2009; GndWorld "Industry Leadership Award," 2006; Network World's 50 Most Powerful People in Networking, 2005; D.Sc (Honoris Causa), University of Canterbury, NZ, 2005; InfoWorld Innovator, 2003, 2004, 2005; Fellow, American Association for the Advancement of Science, 2004; R&D Magazine Innovator of the Year, 2003; University of Chicago Distinguished Service Award, 2003; MIT Technology Review, one of "Ten Technologies That Will Change the World," 2003; British Computer Society Lovelace Medal, 2002; Fellow, British Computer Society, 2002; Federal Laboratory Consortium Technology Transfer Award, 2002; R&D100 "Most Promising New Technology" Award, 2002; Gordon Bell Award, 2001; Global Information Infrastructure "Next Generation" Award, 1997; Best Paper Award, 1995 Supercomputing Conference; British Computer Society Award for Technical Innovation, 1989.

Exhibit A (ctd.) - Publications

1. Foster, I., Gregory, S., Ringwood, G. and Satoh, K. A sequential implementation of Parlog. *Third International Conference on Logic Programming*:149-156, 1986.
2. Foster, I.T. and Kusalik, A.J. A logical treatment of secondary storage. *Proceedings of the Third IEEE Symposium on Logic Programming*:58-67, 1986.
3. Clark, K. and Foster, I. A declarative environment for concurrent logic programming. *TAPSOFT'87*:212-242, 1987.
4. Foster, I. and Taylor, S. Flat Parlog: a basis for comparison. *International journal of parallel programming*, 16(2):87-125, 1987.
5. Foster, I. Parallel implementation of Parlog. *International Conference on Parallel Processing. IEEE Computer Society*:9-16, 1988.
6. Butler, R., Butler, T., Foster, I., Karonis, N., Olson, R., Overbeek, R., Pfluger, N., Price, M. and Tuecke, S. Generating alignments of genetic sequences. Argonne National Lab., IL (USA). Mathematics and Computer Science Div., 1989.
7. Foster, I. A multicomputer garbage collector for a single-assignment language. *International Journal of Parallel Programming*, 18(3):181-203, 1989.
8. Foster, I. Implementation of a declarative state-transition system. *Software: Practice and Experience*, 19(4):351-370, 1989.
9. Foster, I. and Taylor, S. Strand: A practical parallel programming language. Argonne National Lab., IL (USA), 1989.
10. Gregory, S., Foster, I.T., Burt, A.D. and Ringwood, G.A. An abstract machine for the implementation of PARLOG on uniprocessors. *New Generation Computing*, 6(4):389-420, 1989.
11. Butler, R., Foster, I., Jindal, A. and Overbeek, R. A high-performance parallel theorem prover. *10th International Conference on Automated Deduction*:649-650, 1990.
12. Foster, I. *Systems programming in parallel logic languages*. Prentice Hall, 1990.
13. Foster, I., Kesselman, C. and Taylor, S. Concurrency: Simple concepts and powerful tools. *The Computer Journal*, 33(6):501-507, 1990.
14. Foster, I. and Overbeek, R. Bilingual parallel programming. Argonne National Lab., IL (USA), 1990.
15. Foster, I. and Stevens, R. Parallel programming with algorithmic skeletons. Argonne National Lab., IL (USA), 1990.
16. Foster, I. and Taylor, S. *Strand*. Prentice-Hall, 1990.
17. Chern, I.L. and Foster, I.T. Parallel implementation of a control volume method for solving pdes on the sphere. *Proceedings of the Fifth SIAM Conference on Parallel Processing for Scientific Computing*:301-306, 1991.
18. Foster, I. Automatic generation of self-scheduling programs. *Parallel and Distributed Systems, IEEE Transactions on*, 2(1):68-78, 1991.
19. Foster, I. A declarative state transition system. *The Journal of Logic Programming*, 10(1):45-67, 1991.
20. Foster, I. Efficient computation control in concurrent logic languages. *New generation computing*, 10(1):1-21, 1991.
21. Foster, I., Gropp, W. and Stevens, R., The parallel scalability of the spectral transform method. 1991, Society for Industrial and Applied Mathematics, 307-312.
22. Chern, I. and Foster, I., Design and parallel implementation of two numerical methods for modeling the atmospheric circulation. 1992, 83-96.
23. Chern, I. and Foster, I. Parallel implementation of a control method for solving PDEs on the sphere. 1992.
24. Foster, I. Fortran M as a language for building earth system models. *Preprint MCS-P345-*

- 0193, Argonne National Laboratory, and Proc. 5th ECMWF Workshop on Parallel Processing in Meteorology, ECMWF, Reading, UK, 1992.
25. Foster, I., Kesselman, C. and Tuecke, S. The 1st Generation Grid. *Communications of the ACM*, 35(6):45-52, 1992.
 26. Foster, I., Olson, R. and Tuecke, S. Productive parallel programming: The PCN approach. *Scientific Programming*, 1(1):51-66, 1992.
 27. Chandy, K.M. and Foster, I. Deterministic parallel Fortran. *Proceedings of the sixth SIAM conference on parallel processing for scientific computing, Norfolk, Virginia*, 1993.
 28. Drake, J., Flanery, R., Walker, D., Worley, P., Foster, I., Michalakes, J., Stevens, R., Hack, J. and Williamson, D. The message passing version of the parallel community climate model. *Parallel Supercomputing in Atmospheric Science: Proceedings of the Fifth ECMWF Workshop on Use of Parallel Processors in Meteorology*, G.-R. Ho man and T. Kauranne, eds., World Scientific Publishing Co. Pte. Ltd., Singapore:500-513, 1993.
 29. Foster, I. and Kesselman, C., Integrating task and data parallelism. 1993, ACM, 154-155.
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 35. Foster, I. Task parallelism and high-performance languages. *IEEE Parallel & Distributed Technology: Systems & Technology*, 2(3):27-36, 1994.
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 37. Foster, I., Kesselman, C. and Tuecke, S. The Nexus task-parallel runtime system. *Proc. 1st Intl Workshop on Parallel Processing*:457-462, 1994.
 38. Foster, I. and Taylor, S. A compiler approach to scalable concurrent-program design. *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 16(3):577-604, 1994.
 39. Foster, I. and Xu, M. Libraries for parallel paradigm integration. *Nova Science Publishers*, 1994.
 40. Foster, I., Xu, M. and Avalani, B., A compilation system that integrates High Performance Fortran and Fortran M. 1994, IEEE, 293-300.
 41. Foster, I.T. and Toonen, B.R., Load-balancing algorithms for climate models. 1994, IEEE, 674-681.
 42. Foster, I.T. and Walker, D.W. Paradigms and strategies for scientific computing on distributed memory concurrent computers. *High Performance Computing Symposium 1994: grand challenges in computer simulation: proceedings of the 1994 Simulation Multiconference, April 10-15, 1994, The Hyatt Regency La Jolla at Aventine, San Diego, California*:252, 1994.
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- tunable parallel benchmark code. 1994, IEEE, 207-214.
44. Abramson, D., Foster, I., Michalakes, J. and Sosic, R., Relative debugging and its application to the development of large numerical models. 1995, ACM, 51.
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66. Foster, I., Geisler, J. and Tuecke, S., MPI on the I-WAY: A wide-area, multimethod implementation of the Message Passing Interface. 1996, IEEE, 10-17.
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81. Chen, Y., Nieplocha, J., Foster, I. and Winslett, M., Optimizing collective I/O performance on parallel computers: A multisystem study. 1997, ACM, 28-35.
82. Fitzgerald, S., Foster, I., Kesselman, C., Von Laszewski, G., Smith, W. and Tuecke, S., A directory service for configuring high-performance distributed computations. 1997, IEEE, 365-375.
83. Foster, I., Geisler, J., Kesselman, C. and Tuecke, S. Managing multiple communication methods in high-performance networked computing systems. *Journal of Parallel and Distributed Computing*, 40(1):35-48, 1997.
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- parallelism in a data-parallel language. *Journal of parallel and distributed computing*, 45(2):148-158, 1997.
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