

## Koichi Takahashi

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### SUMMARY

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I am currently a Human Frontier Science Program (HFSP) Cross-Disciplinary Fellow at the Molecular Sciences Institute, Berkeley, California. My research interests span every technological areas relevant to cell modeling and simulation, and include effects of non-idealistic nature of intracellular media on signaling pathways, single cell measurement techniques such as correlation spectroscopy, asynchronous discrete event simulation algorithms, and high-performance computing. I am a founding steering committee member of the E-Cell Project, and am the creator / chief system architect of the cellular simulation platform E-Cell System.

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### EDUCATION

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| <b>2004</b> | Ph.D., Bioinformatics, Keio University. Adviser: Masaru Tomita.<br>Thesis: Multi-algorithm and multi-timescale cell biology simulation. |
| <b>2000</b> | M.A., Bioinformatics, Keio University.  |
| <b>1998</b> | Bachelor, Bioinformatics, Keio University.  |
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### POSITIONS

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| 2001 - 2004    | Researcher, Keio University, Japan.   |
| 2004 - 2005    | Visiting Research Fellow, The Molecular Sciences Institute, USA.                        |
| 2005           | Postdoctoral research fellow, Japan Science and Technology Agency, Japan.               |
| 2004 - present | Project Research Associate, Institute for Advanced Biosciences, Keio University, Japan. |
| 2005 - present | Research Fellow, The Molecular Sciences Institute, USA.                                 |
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### HONORS

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| 1997        | Best poster presentation award, Intelligent Systems for Molecular Biology.   |
| 1997, 1999  | Keio University Shonan Fujisawa Campus Award x 2.                            |
| 2000, 2001  | Taikichiro Mori memorial research grant x 2.                                 |
| 2005        | Invited Young Researcher, The 55th Meeting of Nobel Prize Winners in Lindau. |
| 2005 - 2008 | Human Frontier Science Program Cross-disciplinary Long-Term Fellowship.      |

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## MEMBERSHIPS AND EXPERIENCES

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Founding Steering Committee Member, The E-Cell Project.

Programme Committee, Computational Methods for Systems Biology.

Member, International Society for Computational Biology.

Member, Association for Computing Machinery.

Referee, Molecular Systems Biology, Bioinformatics, PSB etc.

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## JOURNAL

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1. Shimizu, T.S., Takahashi, K., Tomita, M. CpG distribution patterns in methylated and non-methylated species, *Gene* 205:103-107 (1997).
2. Tomita, M., Hashimoto, K., Takahashi, K., Shimizu, T., Matsuzaki, Y., Miyoshi, F., Saito, K., Tanida, S., Yugi, K., Venter, J.C., and Hutchison, C. E-CELL: Software environment for whole cell simulation, *Bioinformatics* 15(1):72-84, (1999).
3. Tomita, M., Hashimoto, K., Takahashi, K., Matsuzaki, Y., Matsushima, R., Saito, K., Yugi, K., Miyoshi, F., Nakano, H., Tanida, S., Saito, Y., Kawase, A., Watanabe, N., Shimizu, T., Nakayama, Y. The E-CELL Project: Towards Integrative Simulation of Cellular Processes, *New Generation Computing*, 18 (1), 1-12, (2000).
4. Takahashi, K., Yugi, K., Hashimoto, K., Yamada, Y., Pickett, C.J.F., and Tomita, M. Computational challenges in cell simulation, *IEEE Intelligent Systems*, 17(5):64-71, (2002).
5. Hucka, M., Finney, A., Sauro, H.M., Bolouri, H., Doyle, J.C., Kitano, H., Arkin, A.P., Bornstein, B.J., Bray, D., Cornish-Bowde, A., Cuellar, A.A., Dronov, S., Gilles, E.D., Ginkel, M., Gor, V., Goryanin, I.I., Hedley, W.J., Hodgman, T.C., Hofmeyr, J.-H., Hunter, P.J., Juty, N.S., Kasberger, J.L., Kremling, A., Kummer, Le Novè, N., Loew, L.M., Lucio, D., Mendes, P., Minch, E., Mjolsness, E.D., Nakayama, Y., Nelson, M.R., Nielsen, P.F., Sakurada, T., Schaff, J.C., Shapiro, B.E., Shimizu, T.S., Spence, H.D., Stelling, J., Takahashi, K., Tomita, M., Wagner, J., and Wang, J. The systems biology markup language (SBML): a medium for representation and exchange of biochemical network models, *Bioinformatics* 19(4): 524-531, (2003).
6. Takahashi, K., Ishikawa, N., Sadamoto, Y., Ohta, S., Shiozawa, A., Miyoshi, F., Naito, Y., Nakayama, Y., and Tomita, M. E-Cell 2: Multi-platform E-Cell Simulation System, *Bioinformatics*, 19(13), 1727-1729, (2003).
7. Takahashi, K., Kaizu, K., Hu, B., and Tomita, M. A multi-algorithm, multi-timescale method for cell simulation, *Bioinformatics*, 20(4), 538-546, (2004).
8. Takahashi, K., Arjunan, S.N.V., Tomita, M. Space in Systems Biology of Signaling Pathways - towards intracellular molecular crowding in silico, *FEBS Letters*, 579 1783-1788, (2005).
9. (Invited perspective - Takahashi, K. Towards Computational Systems Biology, *HFSP Journal*, (2008).)

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## CONFERENCE

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10. Tomita, M., Hashimoto, K., Takahashi, K., Shimizu, Y., Matsuzaki, Y., Miyoshi, F., Saito, K., Tanida, S., Yugi, K., Venter, J.C., and Hutchison, C. E-CELL: Software Environment for Whole Cell Simulation . In Genome Informatics 1997, Universal Academy Press, Miyano, S. and Takagi, T. (eds.) Tokyo (1997).
11. Sugimoto, M., Takahashi, K., Kitayama, T., Ito, D., and Tomita, M. Distributed cell biology simulations with E-Cell System, Lecture Notes in Bioinformatics (LNBI), 3370, 20-31, (2005); first appeared in First international workshop on life science grid (LSGRID04), (2005).
12. Takahashi, K. The E-Cell Project and Challenges in Computational Systems Biology, Proceedings of the NIC Workshop 2007, Hansmann, U. H. E., Meinke, J., Mohanty, S., Zimmermann, O. (Eds), John von Neumann Institute for Computing, Julich, NIC Series, Vol. 36, pp. 55-60, (2007).

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## BOOKS / OTHERS

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13. Dhar, P., Takahashi, K., Nakayama, Y., and Tomita, M. Computer Simulation of the Cell, In Encyclopedia of Molecular Cell Biology and Molecular Medicine, Wiley VCH, (2003).
14. K. Takahashi, *E-Cell Simulation Environment Version 3 Users Manual, Software Manual, The E-Cell Project, (2003-2007)*.
15. Addy, N., and Takahashi, K., Foundations of E-Cell Simulation Environment Architecture, In E-Cell System – Basic Concepts and Applications, Eds. Arjunan, S.N.V., Dhar, P., and Tomita, M., Landes Biosciences (2007).

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## TALKS

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16. Modeling scheme and system architecture of E-CELL, Special Workshop on Computer Simulation of the Cell, Special Interest Group of Molecular Biology Informatics, Japanese Society of Artificial Intelligence, Fujisawa, Japan (1998).
17. E-CELL: Simulation Environment for whole cell simulation, Bioinformatics OpenSource Conference; San Diego, USA (2000).
18. Architecture of E-Cell Simulation System, BioSimulation Training Program, Institute for Advanced Biosciences, Japan (2002).
19. E-Cell 3: A generic software environment for cell simulation, ITBL symposium, Tokyo, Japan (2003)
20. Simulation of the Cell: a multi-algorithm approach, Lecture Series Simulation in Cell Biology, Frankfurt, Germany (2003).
21. Multi-algorithm and multi-timescale cell simulation, 4<sup>th</sup> International Conference on Systems Biology, workshop on Large Scale Simulations of Biological Systems , St. Louis, USA (2003).

22. Space in cellular signaling systems - towards spatial modeling of the alpha pathway, The Third Annual Alpha Project Research Symposium, Berkeley, USA (2005).
23. Protein localization and crowding in eucaryotic signaling pathways, The Institute for Atomic and Molecular Physics, Amsterdam, Netherlands (2006).
24. Numerical Simulation and Molecular Systems Biology, plenary lecture at The 21st Century COE Young Scientist Workshop 2006, Hayama, Japan (2006).
25. Future of E-Cell, The E-Cell Tutorial, satellite of The Seventh International Conference on Systems Biology, Yokohama, Japan (2006).
26. The E-Cell 4 Project , The First E-Cell Developers Workshop, Fujisawa, Japan (2007).
27. The E-Cell Project and Challenges in Computational Systems Biology, From Computational Biophysics to Systems Biology 2007 (CBSB07), Julich, Germany (2007).
28. Numerical Simulation and Computational Systems Biology, Global COE seminar, Keio University Medical School, Tokyo, Japan (2007).
29. Numerical Simulation and Computational Systems Biology, invited seminar, RIKEN Genomic Science Center, Yokohama, Japan (2007).
30. The E-Cell Project Towards Computational Systems Biology, Workshop on Frontiers in Application of Systems Modeling and Simulation, The 8th International Conference on Systems Biology, Long Beach, USA (2007)

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## REFERENCES

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Available upon request.