# CURRICULUM VITAE

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## EDUCATION

1991 - 1997 Doctor of Philosophy in Computational Science and Informatics
Computational Biology and Neuroscience Track
Dissertation: "A Computational Model of Cerebellar Saccadic Control."
Dissertation Defense: May 1, 1997.
George Mason University, Fairfax, Virginia

1989 - 1991 Master's of Science in Computer Science
The George Washington University, Washington, DC.

1981 - 1983 Bachelor's of Science in Computer Science
University of Massachusetts, Amherst, Massachusetts

1979 - 1981 Brandeis University, Waltham, Massachusetts

## TEACHING EXPERIENCE

2008 – Present Department of Cognitive Science,
University of California, Irvine
Courses taught:
- Cognitive Neuroscience
- Cognitive Robotics
- Computational Neuroscience
- Cortical Neuroscience
- Perceptual Neuroscience

1997 - 1999 Assistant Professor
Bioinformatics, Computational Neuroscience

Department of Computational Science and Informatics
George Mason University, Fairfax, Virginia
Courses taught:
Bioinformatics
Computational Neuroscience Systems

1990 - 1991 Graduate Teaching Assistant
Senior Microprocessor Laboratory
Department of Electrical Engineering and Computer Science
George Washington University, Washington, D.C.

1989 - 1990 Graduate Teaching Assistant
Senior Computer Project Laboratory
Department of Electrical Engineering and Computer Science
George Washington University, Washington, D.C.

**EMPLOYMENT**

2008 - Present Professor
Department of Cognitive Sciences
Department of Computer Science
University of California, Irvine
Irvine, CA

2011 - 2007 Senior Fellow
Theoretical Neurobiology
The Neurosciences Institute
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1999 - 2011 Postdoctoral Fellow
Theoretical Neurobiology
The Neurosciences Institute
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1999- 2003 Consultant
Generation and Description of Dendritic Morphology
Human Brain Project / Neuroinformatics Research Grant
National Institute of Neurological Disorders and Stroke /
National Institute of Mental Health
Grant Number: R01-NS39600-01

1996 - 1999 Research Professor
Krasnow Institute for Advanced Study
George Mason University
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|---|---|
| 1997 - 1999 | Assistant Professor<br>Department of Computational Science and Informatics<br>George Mason University, Fairfax, VA |
| 1994 - 1999 | Chief Scientist<br>Fatigue and Drug Detection - Oculomotor Measurements<br>Eye Tracking Software Development<br>Fitness Impairment Testing<br>Pulse Medical Instruments, Incorporated, Rockville, MD |
| 1997 - 1999 | Consultant<br>Police Executive Research Forum<br>U.S. Department of Justice's National Institute of Justice<br>Grant Number: 96-IJ-CS-0046 |
| 1993 - 1994 | Software Engineer<br>System Services Software<br>FAA Air Traffic Control Advanced Automation System<br>Loral Corporation, Rockville, MD |
| 1991 - 1993 | Software Engineer<br>System Services Common Code Software<br>FAA Air Traffic Control Advanced Automation System<br>IBM Corporation - Federal Systems Company, Rockville, MD |
| 1989 | Software Engineer<br>Infrared guided Missile Seeker software.<br>Raytheon Corporation, Bedford, MA |
| 1988 - 1989 | Consultant to Japanese Defense Army<br>Command and Control software for the PATRIOT Missile System<br>Mitsubishi Heavy Industries, Nagoya, Japan |
| 1984 - 1989 | Software Engineer<br>Training and Simulation software for the PATRIOT Missile system.<br>Infrared guided Missile Seeker software.<br>Communications software for the PATRIOT Missile system<br>Input/Output Processor software for Continuous Wave Radar<br>Raytheon Corporation, Bedford, MA |

**PUBLICATIONS**
Reprints of publications can be found at: http://www.socsci.uci.edu/~jkrichma/publications.html
Google Scholar: https://scholar.google.com/citations?user=ErpbA8wAAAAJ&hl=en&oi=sra

**BOOK**

1. Hwu, T.J., and Krichmar, J.L. (2022). Neurorobotics: Connecting the Brain, Body and Environment. (MIT Press).

**EDITED BOOK**

1. Krichmar, J.L., and Wagatsuma, H., eds. (2011). Neuromorphic and Brain-Based Robots (Cambridge University Press).

**JOURNAL ARTICLES**

1. Alonso, N., & Krichmar, J. L. (2024). A sparse quantized hopfield network for online-continual memory. *Nature Communications*, *15*(1), 3722. https://doi.org/10.1038/s41467-024-46976-4
2. Ahumada-Newhart, V., Kashyap, H.J., Hwu, T., Tian, Y., Mirzakhanian, L., Minton, M., Seader, S., Hedden, S., Moore, D., Krichmar, J., and Eccles, J.S. (2023). Evaluation of the Toyota Human Support Robot (HSR) for Social Interaction and Learning. The International Journal of Technology, Knowledge, and Society *19*, 21-52. doi:10.18848/1832-3669/CGP/v19i01/21-52.
3. Balaji, A., Huynh, P.K., Catthoor, F., Dutt, N.D., Krichmar, J.L., and Das, A. (2023). NeuSB: A Scalable Interconnect Architecture for Spiking Neuromorphic Hardware. IEEE T Emerg Top Com 11, 373-387. 10.1109/Tetc.2023.3238708.
4. Chen, K.X., Kashyap, H.J., Krichmar, J.L., and Li, X.M. (2023). What can computer vision learn from visual neuroscience? Introduction to the special issue. Biol Cybern 117, 297-298. 10.1007/s00422-023-00977-6.
5. Kopsick, J.D., Tecuatl, C., Moradi, K., Attili, S.M., Kashyap, H.J., Xing, J.W., Chen, K.X., Krichmar, J.L., and Ascoli, G.A. (2022). Robust Resting-State Dynamics in a Large-Scale Spiking Neural Network Model of Area CA3 in the Mouse Hippocampus. Cogn Comput. vol. 15, no. 4, pp. 1190-1210, DOI:10.1007/s12559-021-09954-2.
6. Xing, J., Nagata, T., Zou, X., Neftci, E., and Krichmar, J.L. (2023). Achieving efficient interpretability of reinforcement learning via policy distillation and selective input gradient regularization. Neural Networks *161*, 228-241. https://doi.org/10.1016/j.neunet.2023.01.025.
7. Chen, K., Beyeler, M., and Krichmar, J.L. (2022). Cortical Motion Perception Emerges from Dimensionality Reduction with Evolved Spike-Timing-Dependent Plasticity Rules. The Journal of Neuroscience *42*, 5882. 10.1523/JNEUROSCI.0384-22.2022.
8. Krichmar, J.L., and Hwu, T.J. (2022). Design Principles for Neurorobotics. Front Neurorobotics *16*. 10.3389/fnbot.2022.882518.
9. Kudithipudi, D., Aguilar-Simon, M., Babb, J., Bazhenov, M., Blackiston, D., Bongard, J., Brna, A.P., Chakravarthi Raja, S., Cheney, N., Clune, J., et al. (2022). Biological

underpinnings for lifelong learning machines. Nature Machine Intelligence *4*, 196-210. 10.1038/s42256-022-00452-0.
10. Titirsha, T., Song, S., Das, A., Krichmar, J., Dutt, N., Kandasamy, N., and Catthoor, F. (2022). Endurance-Aware Mapping of Spiking Neural Networks to Neuromorphic Hardware. IEEE Transactions on Parallel and Distributed Systems 33, 288-301.
11. Xing, J., Chrastil, E.R., Nitz, D.A., and Krichmar, J.L. (2022). Linking global top-down views to first-person views in the brain. Proceedings of the National Academy of Sciences *119*, e2202024119. 10.1073/pnas.2202024119.
12. Krichmar, J.L., and He, C. (2023). Importance of Path Planning Variability: A Simulation Study. Topics in Cognitive Science *15*, 139-162. https://doi.org/10.1111/tops.12568.
13. Krichmar, J.L. (2021). Gerald Edelman's Steps Toward a Conscious Artifact. Journal of Artificial Intelligence and Consciousness, 1-9. DOI: https://doi.org/10.1142/S2705078521500144
14. Krichmar, J.L., Olds, J.L., Sanchez-Andres, J.V., and Tang, H. (2021). Editorial: Explainable Artificial Intelligence and Neuroscience: Cross-Disciplinary Perspectives. Front Neurorobotics 15.
15. Kashyap, H.J., Fowlkes, C.C., and Krichmar, J.L. (2021). Sparse Representations for Object- and Ego-Motion Estimations in Dynamic Scenes. IEEE Transactions on Neural Networks and Learning Systems 32, 2521-2534.
16. Balaji, A., Song, S., Das, A., Krichmar, J., Dutt, N., Shackleford, J., Kandasamy, N., and Catthoor, F. (2021). Enabling Resource-Aware Mapping of Spiking Neural Networks via Spatial Decomposition. IEEE Embedded Systems Letters 13, 142-145.
17. Chen, K., Hwu, T., Kashyap, H.J., Krichmar, J.L., Stewart, K., Xing, J., and Zou, X. (2020). Neurorobots as a Means Toward Neuroethology and Explainable AI. Front Neurorobotics, 14. doi: 10.3389/fnbot.2020.570308.
18. Zou, X., Kolouri, S., Pilly, P.K., and Krichmar, J.L. (2020). Neuromodulated attention and goal-driven perception in uncertain domains. Neural Networks 125, 56-69.
19. Hwu, T., and Krichmar, J.L. (2020). A neural model of schemas and memory encoding. Biological Cybernetics, 114, 169-186.
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21. Balaji, A., Das, A., Wu, Y., Huynh, K., Dell'Anna, F.G., Indiveri, G., Krichmar, J.L., Dutt, N.D., Schaafsma, S., and Catthoor, F. (2020). Mapping Spiking Neural Networks to Neuromorphic Hardware. IEEE Transactions in VLSI Systems, 28, 76-86.
22. Belkaid, M., and Krichmar, J.L. (2020). Modeling uncertainty-seeking behavior mediated by cholinergic influence on dopamine. Neural Networks 125, 10-18.
23. Balaji, A., Song, S.H., Das, A., Dutt, N., Krichmar, J., Kandasamy, N., and Catthoor, F. (2019). A Framework to Explore Workload-Specific Performance and Lifetime Trade-offs in Neuromorphic Computing. Ieee Comput Archit L 18, 149-152.
24. Beyeler, M., Rounds, E.L., Carlson, K.D., Dutt, N., and Krichmar, J.L. (2019). Neural correlates of sparse coding and dimensionality reduction. Plos Comput Biol 15.
25. Krichmar, J.L., Severa, W., Khan, M.S., and Olds, J.L. (2019). Making BREAD: Biomimetic Strategies for Artificial Intelligence Now and in the Future. Front Neuroscience 13.
26. Gaussier, P., Banquet, J.P., Cuperlier, N., Quoy, M., Aubin, L., Jacob, P.-Y., Sargolini, F., Save, E., Krichmar, J.L., and Poucet, B. (2019). Merging information in the entorhinal

cortex: what can we learn from robotics experiments and modeling? The Journal of Experimental Biology 222, 1-13.
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29. Hwu, T., Wang, A.Y., Oros, N., and Krichmar, J.L. (2018). Adaptive Robot Path Planning Using a Spiking Neuron Algorithm With Axonal Delays. IEEE Transactions on Cognitive and Developmental Systems 10, 126-137. ***IEEE CIS TCDS Outstanding Paper Award.***
30. Rounds, E.L., Alexander, A.S., Nitz, D.A., and Krichmar, J.L. (2018). Conjunctive coding in an evolved spiking model of retrosplenial cortex. Behav Neuroscience. DOI: 10.1037/bne0000236
31. Tang, H., Huang, T., Krichmar, J.L., Orchard, G., and Basu, A. (2018). Guest Editorial Special Issue on Neuromorphic Computing and Cognitive Systems. IEEE Transactions on Cognitive and Developmental Systems 10, 122-125.
32. Venkadesh, S., Komendantov, A.O., Listopad, S., Scott, E.O., De Jong, K., Krichmar, J.L., and Ascoli, G.A. (2018). Evolving Simple Models of Diverse Intrinsic Dynamics in Hippocampal Neuron Types. Frontiers in Neuroinformatics 12.
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36. Craig, A.B., Grossman, E., and Krichmar, J.L. (2017). Investigation of autistic traits through strategic decision-making in games with adaptive agents. Scientific Reports 7, 5533, DOI:10.1038/s41598-017-05933-6.
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45. Avery, M., and Krichmar, J.L. (2015). Improper activation of D1 and D2 receptors leads to excess noise in prefrontal cortex. Frontiers in Computational Neuroscience Vol. *9*, Article 31, 1-15.
46. Krichmar, J.L., Coussy, P., and Dutt, N. (2015). Large-Scale Spiking Neural Networks using Neuromorphic Hardware Compatible Models. ACM Journal on Emerging Technologies in Computing Systems, Vol. 11, No. 4, Article 36, 1-18.
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49. Beyeler, M., Richert, M., Dutt, N.D., and Krichmar, J.L. (2014). Efficient Spiking Neural Network Model of Pattern Motion Selectivity in Visual Cortex. Neuroinformatics.
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53. Avery, M., Dutt, N., and Krichmar, J.L. (2013). A large-scale neural network model of the influence of neuromodulatory levels on working memory and behavior. Frontiers in Computational Neuroscience *7*.
54. Zaldivar, A., and Krichmar, J.L. (2013). Interactions between the neuromodulatory systems and the amygdala: exploratory survey using the Allen Mouse Brain Atlas. Brain structure & function *218*, 1513-1530.
55. Krichmar, J.L., and Röhrbein, F. (2013). Value and Reward Based Learning in Neurorobots. Frontiers in neurorobotics *7*.
56. Beyeler, M., Dutt, N.D., and Krichmar, J.L. (2013). Categorization and decision-making in a neurobiologically plausible spiking network using a STDP-like learning rule. Neural Networks *48*, 109-124.
57. Craig, A.B., Asher, D.E., Oros, N., Brewer, A.A., and Krichmar, J.L. (2013). Social contracts and human–computer interaction with simulated adapting agents. Adaptive Behavior *21*, 371-387.
58. Krichmar, J.L. (2013). A neurorobotic platform to test the influence of neuromodulatory signaling on anxious and curious behavior. Frontiers in neurorobotics *7*:1, 1-17.

59. Asher, D.E., Zaldivar, A., Barton, B., Brewer, A.A., and Krichmar, J.L. (2012). Reciprocity and Retaliation in Social Games With Adaptive Agents. IEEE Transactions on Autonomous Mental Development *4*, 226-238.
60. Krichmar, J.L. (2012). Design principles for biologically inspired cognitive robotics. Biologically Inspired Cognitive Architectures 1, 73-81.
61. Avery, M.C., Nitz, D.A., Chiba, A.A., and Krichmar, J.L. (2012). Simulation of Cholinergic and Noradrenergic Modulation of Behavior in Uncertain Environments. Frontiers in Computational Neuroscience *6*, 1-16.
62. Richert, M., Nageswaran, J.M., Dutt, N., and Krichmar, J.L. (2011). An efficient simulation environment for modeling large-scale cortical processing. Frontiers in Neuroinformatics *5*, 1-15.
63. Cox, B.R., and Krichmar, J.L. (2009). Neuromodulation as a Robot Controller: A Brain Inspired Design Strategy for Controlling Autonomous Robots. IEEE Robotics & Automation Magazine *16*, 72-80.
64. Browne, W., Kawamura, K., Krichmar, J., Harwin, W., and Wagatsuma, H. (2009). Cognitive robotics: new insights into robot and human intelligence by reverse engineering brain functions. IEEE Robotics and Automation Magazine *16*, 17-18.
65. Nageswaran, J.M., Dutt, N., Krichmar, J.L., Nicolau, A., and Veidenbaum, A.V. (2009). A configurable simulation environment for the efficient simulation of large-scale spiking neural networks on graphics processors. Neural Networks *22*, 791-800.
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85. Krichmar, J.L., *Evolving Intelligent Robots: review of "Evolutionary Robotics: The biology, Intelligence, And Technology of Self-Organizing Machines" by S. Nolfi and D. Floreano.* Complexity, 2001. **6**(3): p. 51-53.
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92. Krichmar, J.L., G.A. Ascoli, L. Hunter, and J.L. Olds, *A Model of Cerebellar Saccadic Motor Learning using Qualitative Reasoning.* Lecture Notes in Computer Science, Artificial and Natural Neural Networks, 1997. **1240**: p. 134-145.

**REFEREED CONFERENCE PROCEEDINGS**

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2. Espino, H., Bain, R., and Krichmar, J.L. (2023). Selective Memory Replay Improves Exploration in a Spiking Wavefront Planner. IEEE International Joint Conference on Neural Networks. DOI:10.1109/Ijcnn54540.2023.10191940.
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7. Xing, J., Zou, X., Pilly, P.K., Ketz, N.A., and Krichmar, J.L. (2022). Adapting to Environment Changes Through Neuromodulation of Reinforcement Learning. held in Cham, L. Cañamero, P. Gaussier, M. Wilson, S. Boucenna, and N. Cuperlier, eds. (Springer International Publishing), pp. 115-126.
8. Alonso, N., Millidge, B., Krichmar, J., & Neftci, E. (2022). A Theoretical Framework for Inference Learning. Advances in Neural Information Processing Systems, Eds. Alice H. Oh, Alekh Agarwal, Danielle Belgrave, and Kyunghyun Cho. https://openreview.net/forum?id=7yJMZwhIC2k.
9. Chen, K., Johnson, A., O., S.E., Xinyun, Z., D., D.J.K., A., N.D., and L., K.J. (2021). Differential Spatial Representations in Hippocampal CA1 and Subiculum Emerge in Evolved Spiking Neural Networks. Paper presented at: International Joint Conference on Neural Networks (IJCNN).
10. Xing, J., Nagata, T., Zou, X., Neftci, E., and Krichmar, J.L. (2021). Domain Adaptation In Reinforcement Learning Via Latent Unified State Representation. In Proceedings of the AAAI Conference on Artificial Intelligence, pp. 10452-10459.

11. Zou, X., Scott, E.O., Johnson, A.B., Chen, K., Nitz, D.A., Jong, K.A.D., and Krichmar, J.L. (2021). Neuroevolution of a Recurrent Neural Network for Spatial and Working Memory in a Simulated Robotic Environment. Paper presented at: Genetic and Evolutionary Computation Conference (GECCO) (Lille, France: ACM).
12. Balaji, A., Adiraju, P., Kashyap, H.J., Das, A., Krichmar, J.L., Dutt, N.D., and Catthoor, F. (2020). PyCARL: A PyNN Interface for Hardware-Software Co-Simulation of Spiking Neural Network. IEEE International Joint Conference on Neural Networks (IJCNN).
13. Zou, X., Hwu, T., Krichmar, J., and Neftci, E. (2020). Terrain Classification with a Reservoir-Based Network of Spiking Neurons. Paper presented at: 2020 IEEE International Symposium on Circuits and Systems (ISCAS). pp. 1-5. doi: 10.1109/ISCAS45731.2020.9180740
14. Hwu, T., Kashyap, H.J., and Krichmar, J.L. (2020). A Neurobiological Schema Model for Contextual Awareness in Robotics. In IEEE International Joint Conference on Neural Networks (IJCNN) (Glasgow). ***Outstanding Paper Award.***
15. Xing, J., Zou, X., and Krichmar, J.L. (2020). Neuromodulated Patience for Robot and Self-Driving Vehicle Navigation. Paper presented at: IEEE International Joint Conference on Neural Networks (IJCNN) (Glasgow).
16. Chou, T.-S., Kashyap, H.J., Xing, J., Listopad, S., Rounds, E.L., Beyeler, M., Dutt, N., and Krichmar, J.L. (2018). CARLsim 4: An Open Source Library for Large Scale, Biologically Detailed Spiking Neural Network Simulation using Heterogeneous Clusters. Paper presented at: International Joint Conference on Neural Networks (IJCNN) (Rio De Janeiro: IEEE Explore).
17. Kashyap, H.J., Detorakis, G., Dutt, N., Krichmar, J.L., and Neftci, E. (2018). A Recurrent Neural Network Based Model of Predictive Smooth Pursuit Eye Movement in Primates. Paper presented at: International Joint Conference on Neural Networks (IJCNN) (Rio De Janeiro: IEEE Explore).
18. Krichmar, J.L., and Chou, T.-S. (2018). A Tactile Robot for Developmental Disorder Therapy. Paper presented at: Technology, Mind, and Society (Washington, DC: ACM).
19. Hwu, T., Isbell, J., Oros, N., and Krichmar, J. (2017a). A Self-Driving Robot Using Deep Convolutional Neural Networks on Neuromorphic Hardware. Paper presented at: IEEE International Joint Conference on Neural Networks (Anchorage, AK).
20. Hwu, T., Krichmar, J.L., and Zou, X. (2017b). A Complete Neuromorphic Solution to Outdoor Navigation and Path Planning. Paper presented at: IEEE International Symposium on Circuits & Systems (ISCAS) (Baltimore, MD).
21. Rounds, E.L., Scott, E.O., Alexander, A.S., De Jong, K.A., Nitz, D.A., and Krichmar, J.L. (2016). An Evolutionary Framework for Replicating Neurophysiological Data with Spiking Neural Networks. Paper to be presented at the 14th International Conference of Parallel Problem Solving from Nature (PPSN). Edinburgh, Scotland.
22. Krichmar, J.L. (2016). Path Planning using a Spiking Neuron Algorithm with Axonal Delays. Paper Presented at the 2016 IEEE Congress on Evolutionary Computation. Vancouver. pp. 1219-1226.
23. Beyeler, M.*, Carlson, K.D.*, Chou, T.-S.*, Dutt, N., and Krichmar, J.L. (2015). CARLsim 3: A User-Friendly and Highly Optimized Library for the Creation of Neurobiologically Detailed Spiking Neural Networks. Paper presented at: International Joint Conference on Neural Networks (Killarney, Ireland: IEEE Explore). (*co-first authors).

24. Asher, D.E., Krichmar, J.L., and Oros, N. (2014). Evolution of Biological Plausible Neural Networks Performing a Visually Guided Reaching Task. Paper presented at: Genetic and Evolutionary Computation Conference (GECCO) (Vancouver: ACM).
25. Bucci, L.D., Chou, T.S., and Krichmar, J.L. (2014). Tactile Sensory Decoding in a Neuromorphic Interactive Robot. Paper presented at: 2014 IEEE Conference on Robotics and Automation (Hong Kong).
26. Carlson, K.D., Beyeler, M., Dutt, N., and Krichmar, J.L. (2014). GPGPU Accelerated Simulation and Parameter Tuning for Neuromorphic Applications. . Paper presented at: Proceedings of the 19th Asia and South Pacific Design Automation Conference (ASP-DAC'14) (Singapore: IEEE).
27. Oros, N., and Krichmar, J.L. (2013). Smartphone Based Robotics: Powerful, Flexible and Inexpensive Robots for Hobbyists, Educators, Students and Researchers (Center for Embedded Computer Systems, University of California, Irvine), pp. 1-11.
28. Carlson, K.D., Richert, M., Dutt, N., and Krichmar, J.L. (2013). Biologically Plausible Models of Homeostasis and STDP: Stability and Learning in Spiking Neural Networks. Paper presented at: International Joint Conference on Neural Networks (Dallas, TX: IEEE Explore).
29. Oros, N., and Krichmar, J.L. (2012). Neuromodulation, Attention and Localization Using a Novel Android™ Robotic Platform. In ICDL-EpiRob 2012 : IEEE Conference on Development and Learning and Epigenetic Robotics (San Diego, CA: IEEE Explore).
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31. Asher, D.E., Zhang, S., Zaldivar, A., Lee, M.D., and Krichmar, J.L. (2012). Modeling individual differences in socioeconomic game playing. Paper presented at: COGSCI 2012 - The Annual Meeting of the Cognitive Science Society (Sapporo, Japan).
32. Avery, M., Krichmar, J.L., and Dutt, N. (2012). Spiking Neuron Model of Basal Forebrain Enhancement of Visual Attention. Paper presented at: IEEE World Congress on Computational Intelligence (Brisbane, Australia).
33. Krichmar, J.L. (2012). A Biologically Inspired Action Selection Algorithm Based on Principles of Neuromodulation. Paper presented at: IEEE World Congress on Computational Intelligence (Brisbane, Australia).
34. Krichmar, J.L., Dutt, N., Nageswaran, J.M., and Richert, M. (2011). Neuromorphic Modeling Abstractions and Simulation of Large-Scale Cortical Networks. Paper presented at: IEEE/ACM International Conference on Computer-Aided Design (ICCAD) (San Jose, CA).
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37. Asher, D.E., Zaldivar, A., and Krichmar, J.L. (2010). Effect of Neuromodulation on Performance in Game Playing: A Modeling Study. Paper presented at: International Conference on Development and Learning (Ann Arbor, Michigan, IEEE Xplore).

38. Zaldivar, A., Asher, D.E., and Krichmar, J.L. (2010). Simulation of How Neuromodulation Influences Cooperative Behavior Paper presented at: Simulation of Adaptive Behavior: From Animals to Animats (Paris, France, Springer Lecture Notes on Artificial Intelligence).

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40. Krichmar J.L. (2008), Neuromodulation and Time-Dependent Plasticity in a Model of Foraging Behavior, IEEE 7th International Conference on Development and Learning, Monterey, CA.

41. Krichmar, J.L., and Edelman, G.M. (2007). Design Principles and Constraints Underlying the Construction of Brain-Based Devices. In Lecture Notes in Computer Science: Neural Information Processing (Berlin, Springer-Verlag).

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43. Fleischer, J.G., Szatmary, B., Hutson, D., Moore, D.A., Snook, J.A., Edelman, G.M., and Krichmar, J.L. (2006). *A neurally controlled robot competes and cooperates with humans in Segway soccer*, IEEE International Conference on Robotics and Automation (Orlando, FL).

44. Krichmar, J.L., D.A. Nitz, and G.M. Edelman. *Object recognition, Adaptive Behavior and Learning in Brain-Based Devices*. in *Third International Conference on Development and Learning*. 2004. La Jolla, CA.

45. Seth, A.K., J.L. McKinstry, G.M. Edelman, and J.L. Krichmar, *Texture discrimination by an autonomous mobile brain-based device with whiskers*, in *IEEE International Conference on Robotics and Automation*. 2004: New Orleans, LA. p. 4925-4930.

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47. Krichmar, J.L. and G.M. Edelman, *Brain-Based Devices: Intelligent Systems Based on Principles of the Nervous System*, in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2003: Las Vegas, NV. p. 940-945.

48. Krichmar, J.L. and J.A. Snook, *A neural approach to adaptive behavior and multi-sensor action selection in a mobile device*, in *IEEE Conference on Robotics and Automation*. 2002: Washington, D.C. p. 3864-3869.

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50. Krichmar, J.L., J.A. Snook, G.M. Edelman, and O. Sporns, *Experience-dependent Perceptual Categorization in a Behaving Real-World Device*, in *Animals to Animats 6: Proceedings of the Sixth International Conference on the Simulation of Adaptive Behavior*, J.-A. Meyer, A. Berthoz, D. Floreano, H. Roitblat, and S.W. Wilson, Editors. 2000, A Bradford Book. The MIT Press: Cambridge, MA. p. 41-50.
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52. Krichmar, J.L., G.A. Ascoli, L. Hunter, and J.L. Olds, *Qualitative reasoning as a modeling tool for computational neuroscience*, in *Computational Neuroscience: Trends in Research*, J.M. Bower, Editor. 1998, Plenum Press: New York.
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55. Krichmar, J.L., *Qualitative Reasoning in Neural Modeling: Hodgkin-Huxley Revisited*, in *Intelligent Engineering Through Artificial Neural Networks*, C.H. Dagli, F. B.R., G. J., and K. R.T., Editors. 1994, ASME Press: New York. p. 567-572.
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## BOOK CHAPTERS

1. Hwu, T.J., and Krichmar, J.L. (2022). Neurorobotics: Neuroscience and Robots. In Cognitive Robotics, A. Cangelosi, and M. Asada, eds. (The MIT Press), pp. 19-40. 10.7551/mitpress/13780.003.0006.
2. Avery, M.C. and Krichmar, J.L. (2017), *Models of Neuromodulation* in *Computational Models of Brain and Behavior*, A. Moustafa, Editor, John Wiley & Sons Limited.
3. Krichmar, J.L., and Wagatsuma, H. (2011). History and potential of neuromorphic robotics. In Neuromorphic and Brain-Based Robots, J.L. Krichmar, and H. Wagatsuma, eds. (Cambridge University Press), pp. 3-7.
4. Krichmar, J.L. and S.J. Nasuto, *The relationship between neuronal shape and neuronal activity*, in *Computational Neuroanatomy: Principles and Methods*, G.A. Ascoli, Editor. 2002, Humana Press Inc. p. 105-125.
5. Krichmar, J. L., and Reeke, G. N. (2005). The Darwin Brain-Based Automata: Synthetic Neural Models and Real-World Devices, In *Modeling in the Neurosciences: From*

*Biological Systems to Neuromimetic Robotics*, G. N. Reeke, R. R. Poznanski, K. A. Lindsay, J. R. Rosenberg, and O. Sporns, eds. (Boca Raton: Taylor & Francis), pp. 613-638.

## FUNDING

Air Force Office of Scientific Research (AFOSR)
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National Institute of Neural Disorders and Stroke (NIH)
National Science Foundation (NSF)
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## PATENTS

1. Chelian; S.E., Ziegler; M., Benvenuto; J., Krichmar; J.L., O'Reilly; R.C., Bhattacharyya; R., "Method and apparatus for proactive and reactive cognitive control using models of the anterior cingulate cortex and the neuromodulatory system", 10,635,971, 4/28/2020.
2. Bucci, L.D., Chou, T.-S., Krichmar, J.L., "Tactile, interactive neuromorphic robots", 9,975,038, 5/22/2018.
3. Snook, J.A., Hutson, D.B., Krichmar, J.L., "Special purpose processor implementing a synthetic neural model of the human brain", 8,126,828, 2/28/12.
4. Fleischer, J.G., Szatmary, B., Hutson, D.B., Moore, D.A., Snook, J.A., Edelman, G.M., Krichmar; J.L., "Hybrid Control Device", 7,765,029, 7/27/10.
5. Snook, J.A., Hutson, D.B., Krichmar, J.L, "Neural Modeling and Brain-Based Devices Using Special Purpose Processor", 7,533,071, 5/12/09.
6. Edelman, G.M, Krichmar, J.L., Nitz, D.A., "Mobile brain-based device having a simulated nervous system based on the hippocampus", Patent Number: 7,467,115, Issue Date: 12/16/2008.
7. Seth, A.K. McKinstry, J.L., Edelman, G.M., Krichmar, J.L., "Mobile brain-based device for use in a real world environment", 7,519,452, Issue Date: 4/14/2009.
8. McKinstry, J.L., Edelman; G.M., Krichmar, J.L., "Brain-based device having a cerebellar model for predictive motor control", 7,827,124, Issue Date: November 2, 2010.
9. Rafal, M., Krichmar, J.L., Starin, E., "Pupil Detection System", Patent Number: 5610673, Issue Date: 3/11/1997.

## WORKSHOPS AND MEETINGS ORGANIZED

Conference Chair, From Animals to Animats: 17th International Conference on the Simulation of Adaptive Behavior (SAB 2024).

Steering Committee, 2018 conference on "Technology, Mind & Society", American Psychological Association, Washington DC.

Session Chair, "Advanced Unmanned Systems: Requirements and Groundwork for the Next Generation of Robotics Systems", The 8th International Conference on Applied Human Factors and Ergonomics (AHFE 2017).

Session Chair, "Neuromorphic Circuits & Systems for Robotics", IEEE International Symposium on Circuits and Systems. May 2017.

Organizer of the workshop on *Interacting With Robots Through Touch*, University of California, Irvine, September 2016.

Topic Area leader for "Neuromorphic Path Planning for Robots in a Disaster Response Scenario" at the *Telluride Neuromorphic Cognition Engineering* workshop, July 2016.

Organizer of the IEEE International Conference of Robotics and Automation Workshop on Neurobiologically Inspired Robotics, Hong Kong, June 2014.

Organizer of the 21st *Joint Symposium on Neural Computation*, University of California, Irvine, May 2014.

Co-Organizer of the *15th Annual Joint Symposium on Neural Computation*, University of California, Irvine, May 2008.

Co-Organizer of *Brain-style Robotics: Trends and Perspectives* at The 14th International Conference on Neural Information Processing, Kitakyushu Japan, November 2007.

Organizing committee of the International Workshop on Cognitive Robotics, Intelligence and Control (CogRIC) in Windsor UK, August 2006.

Co-chair of the Segway League at the RoboCup US Open in Atlanta, GA, May 2005.

Co-Organized the *Neurorobotic Models in Neuroscience and Neuroinformatics* workshop at the Eighth International Conference on the Simulation of Adaptive Behavior in Los Angeles, CA, July 2004.

## PROGRAM COMMITTEES

External Review Panel, Sandia National Laboratories.

Chairman, Decade of the Mind Initiative Steering Committee.

7th International Conference on Development and Learning (ICDL-08).

Area Chair, 8th International Conference on Development and Learning (ICDL-09).

SAB 2008 - Simulation of Adaptive Behavior 2008.

ECAL2007 - 9th European Conference on Artificial Life.

## EDITING AND REVIEWING

Managing Editor, Special Issue on "Neurobiologically Inspired Robotics: Enhanced Autonomy Through Neuromorphic Cognition" for *Neural Networks.*
Associate Editor, 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems.
Academic Editor, *International Journal of Humanoid Robotics*
Associate Editor, *IEEE Transactions on Cognitive and Developmental Systems*
Associate Editor, *Frontiers in Neuromorphic Engineering*
Academic Editor, *Frontiers in Neurorobotics*

Guest Editor, Special Issue on What can computer vision learn from visual neuroscience? in *Biological Cybernetics*. 2023.
Guest Editor, Special Issue on Cognitive Robotics in *IEEE Robotics and Automation Magazine*. 2009.
Editor, Special issue of the journal *Neuroinformatics* on "Neurorobotic Models in Neuroscience and Neuroinformatics, Fall 2005.
Reviewer, *Adaptive Behavior*.
Reviewer, *Artificial Life*.
Reviewer, *Cognitive Systems Research*
Reviewer, *Frontiers in Neural Circuits*
Reviewer, *Frontiers in Neuroinformatics*
Reviewer, *Frontiers in Psychology*
Reviewer, *Hippocampus*
Reviewer, *IEEE Computational Intelligence*.
Reviewer, *IEEE Transactions on Neural Networks*.
Reviewer, *Journal of Cognitive Neuroscience*
Reviewer, *Journal of Integrative Neuroscience*
Reviewer, *Journal of Neuroscience*
Reviewer, *Journal of Neuroscience Methods*
Reviewer, *Neurocomputing*.
Reviewer, *Neural Networks*.
Reviewer, *Proceedings of the National Academy of Science*
Reviewer, *Public Library of Science (PLOS)*
Reviewer, *Public Library of Science (PLOS) Computational Biology*
Reviewer, *Science*

## INVITED TALKS

1. "Neuromorphic Path Planning for Mobile Robots.", University of Santa Barbara, May 2024.
2. "Neurorobotics: Connecting the Brain, Body and Environment.", Tufts University, March 2024.
3. "Artificial Intelligence in Culture and Media.", Tufts University, March 2024.
4. "Neurorobotics: Connecting the Brain, Body and Environment"., Anteater Family Weekend, UC Irvine, Irvine CA, October 2023.
5. "Neurorobotics: Connecting the Brain, Body and Environment"., Paramount Picture Studios, Los Angeles CA, April 2023.
6. "Neurorobotics Navigation", Tufts University, Medford MA, March 2023.
7. "Neurorobotics: Connecting the Brain, Body and Environment", Tufts University, Medford MA, March 2023.
8. "Biologically Inspired Algorithms for Continuous Online Robot Navigation", Queensland University of Technology, Brisbane, Australia, June 2023.
9. Design Principles for Neurorobotics. University of Southern California, Los Angeles, January 2023.
10. Design Principles for Neurorobotics. Simulation of Adaptive Behavior, Cergy-Pointoise, France, September 2022.

11. “Neurorobotics: Connecting the Brain, Body and Environment.” iCog: Istituto Italiano di Tecnologia (IIT), April 2021.
12. “Neurorobotics: Connecting the Brain, Body and Environment.” Trans Air Virtual Workshop on Cognitive Architectures for Robot Agents, March 2021.
13. “Neurorobots as a Means Toward Neuroethology and Explainable AI.” Virtual Workshop on Explainable AI, International Neural Network Society, November 2020.
14. “A Neurobiological Schema Model for Contextual Awareness in Robotics”, NeuroDevRob: Robotics, Development and Neurosciences. Cergy-Pontoise (France), December 2019.
15. “Neurorobotics: A Thriving Community and a Promising Pathway Toward Intelligent Cognitive Robots”, Neurorobotics Research Consortium, University of Minnesota, June 2019.
16. “LASER Talk: Artificial Life + Intelligence, UCI Applied Innovation, February 2019.
17. “Robots are Here to Help! Developing smarter robots to improve our lives”, UC Irvine Homecoming, February 2019.
18. “Neurorobotics: A Thriving Community and a Promising Pathway Toward Intelligent Cognitive Robots”, Saddleback College Emeritus Institute - Dorothy Marie Lowry Distinguished Guest Lecture Series, Laguna Woods, CA, January 2019.
19. “Efficient Coding, Prediction and Mental Imagery for Intelligent, Cognitive Behavior in Robots”, Contextual Robotics Institute, University of California, San Diego, February 2018.
20. “Efficient Coding, Prediction and Mental Imagery for Intelligent, Cognitive Behavior in Robots”, Keynote at The Second IEEE International Conference on Robotic Computing, Laguna Hills, CA, February 2018.
21. “Sensory Integration Therapy for ASD in a Touch Based Assistive Robot”, Brain Institute, Vanderbilt University, Nashville, TN, December 2017.
22. “Efficient, Predictive Coding and Thermodynamic Computing”, Keynote at the Intelligent Cognitive Assistants Workshop IBM Research-Almaden, San Jose, California, November 2017.
23. “Sparse Coding, Dimensionality Reduction, and Synaptic Plasticity: Evolving and Validating Biologically Realistic Models”, Institute of Neural Computation, University of California, San Diego, June 2017.
24. “Sparse Coding, Dimensionality Reduction, and Synaptic Plasticity: Evolving and Validating Biologically Realistic Models”, Institute of Neural Computation, Sandia National Laboratories, Albuquerque, NM, June 2017.
25. “Neurorobots – Understanding the Brain and Creating More Intelligent Machines”, Tufts University, Medford Massachusetts, March 2017.
26. "A Socially Assistive Robot That Interacts With People Through Tactile And Bi-Directional Learning", Workshop on Body Map and Touch Perception in Brains, Robots and Babies, Maison de la Recherche (MIR) de l'universite de Cergy-Pontoise, Neuville.
27. “Adaptive Robot Path Planning Using a Spiking Neuron Algorithm with Axonal Delays”, University of Cergy-Pontoise, Cergy, France, December 2016.
28. “Towards a Modeling Framework for the Efficient Creation, Simulation and Analysis of Brain Functions”, 2016 International Symposium on Neuromorphic Cognitive Computing and Robotics, Chengdu, China, September 2016.
29. “Towards a modeling framework for the efficient creation, simulation and analysis of

brain functions". Keynote speaker at the 2016 INCF Neuroinformatics meeting, Reading, UK, September 2016.

30. "A Framework for Replicating Neurophysiological Data that Leverages Evolutionary Algorithms and GPU Acceleration", Workshop on "Evolution in Cognition" at the Genetic and Evolutionary Computation Conference (GECCO), Denver, CO, July 2016.
31. "Neurorobotics and Neuromorphic Engineering: A Brain Inspired Approach to Developing Robot Control Systems." Mechanical and Aerospace Dynamics Control Seminar, University of California, San Diego, May 2016.
32. "Brain-Based Robots: A Means to Creating More Intelligent Machines." Academic Business Officer Group (ABOG) Conference, Irvine CA, April 2016.
33. "Value Systems: Precursor to Emotion?" Emotions as Feedback Signals workshop at the Lorentz Center, Leiden, Netherlands, April 2016.
34. "Brain-Based Robots A Means to Creating More Intelligent Machines", Upward Bound, University of California, Riverside, January 2016.
35. "A Cortical Neural Network Model for Visually Guided Robot Navigation", at the IJCNN 2015 Workshop on Spatial Representations in Biology and Robots, Killarney, Ireland, July 2015.
36. "Large-Scale, Biologically Detailed Neuromorphic Networks: Taming the Beast", Northrop-Grumman, Redondo Beach, CA, February 2015.
37. "CARL-SJR: A Tactile, Interactive Robot for Developmental Disorder Therapy", Temporal Dynamics of Learning Center, University of California, San Diego, February 2015.
38. "CARL-SJR: A Socially Assistive Robot with Rich Tactile Sensory Interaction", Institute for Neural Computation, University of California, San Diego, October 2014.
39. Combining Neuromorphic Applications With Neurorobotics: A Large-Scale Cortical Model For Visually Guided Navigation, Institut für Informatik der Technischen Universität München, Munich, Germany, October 2014.
40. "GPGPU Accelerated Simulation and parameter tuning for Neuromorphic Applications", Neuro-Inspired Computing Elements workshop, Albuquerque, NM, February 2014.
41. "Neuromodulation and Neurorobots", Qualcomm Research Center, Qualcomm Incorporated, San Diego, CA, July 2013.
42. "Brain principles and modeling abstractions", International Workshop on Neuromorphic and Brain-Based Computing Systems, Design Automation Test in Europe, Grenoble, France, March 2013.
43. "Neuromorphic modeling abstractions and simulations of large-scale cortical networks", Dynamics of multifunction brain networks MURI Winter School, San Diego, CA, January 2013.
44. "Design Principles for Biologically Inspired Cognitive Robotics", Dynamics of multifunction brain networks MURI Winter School, San Diego, CA, January 2013.
45. "Design Principles for Biologically Inspired Cognitive Robotics", Graduate School of Engineering, Osaka University, Japan, August 2012.
46. "Neuromodulation as a Robot Controller: A Brain-Inspired Strategy for Controlling Autonomous Robots and Studying Decision-Making", Queensland University of Technology, Brisbane Australia, June 2012.
47. "Design principles for biologically inspired cognitive robotics." Sixteenth International Conference On Cognitive And Neural Systems, Boston University, Boston, MA, May

2012.

48. “Brain-Based Robots and Neuromorphic Engineering, Computer Science Seminar”, University of California, Irvine, January 2012.
49. “Neuromorphic Modeling Abstractions and Simulation of Large-Scale Cortical Networks.” IEEE/ACM International Conference on Computer-Aided Design (ICCAD), San Jose, CA, November 2011.
50. “Neuromorphic and Brain-Based Robots”, International Conference on Biologically Inspired Cognitive Architectures, Washington, DC, November 2011.
51. “Neuromodulation as a Brain-Inspired Strategy for Controlling Autonomous Robots and a Means to Investigate Social Cognition during Human-Robot Interactions”, Dynamics of Brain-Body-Environment Systems colloquium, Indiana University, Bloomington, IN, October 2011.
52. “Understanding Cognition Through Building Brain-Inspired Robots”, INSIDE UCI Series, Summer Session 2011, University of California, Irvine, August, 2011.
53. "Computational Approaches in Cognitive Neuroscience: Case studies in neurobotics and large-scale cortical modeling", National Brain Research Centre, Manesar, Haryana, India, July 2011.
54. “Computational Approaches in Cognitive Neuroscience”, Brain and Cognition Workshop, The Centre for Neuroscience, Indian Institute of Science, Bangalore, India, July, 2011.
55. “Building Brain-Inspired Robots (SC 215)”, Osher Life Long Learning Institute, Irvine, CA, December 2010.
56. “Understanding Cognition through Building Brain-Inspired Robots”, The Inside Edge Foundation for Education, Irvine, CA, November 2010.
57. “Effect of Neuromodulation on Human-Robot Interactions and Game Playing”, Electrical Engineering and Computer Science Technical Seminar Series, University of California, Merced, October 2010.
58. “Effect of Neuromodulation on Cooperative Behavior: A Human-Neurorobot Interaction Study”, at the Beyond Brain Machine Interfaces workshop, 2010 Neural Interfaces Conference, Long Beach, CA, June 2010.
59. “Understanding Cognition through Building Brain Inspired Robots” at the Chief Executive Roundtable Retreat, Cavallo Point in Sausalito, California, May 2010.
60. “Neurorobotics and Modeling Cognitive Function” at the Expert Speaker Series for the School of Social Sciences, University of California, Irvine, February 2010.
61. “Neurorobotics and Modeling Cognitive Function” at the Chancellor’s Club, University of California, Irvine, October 2009.
62. “Using neurally inspired robots to study brain function: Principles and mechanisms” at the Artificial Intelligence Laboratory, University of Zurich, Zurich, Switzerland, September 2009.
63. “Using neurally inspired robots to study brain function: Principles and mechanisms” at the Laboratory of Intelligent Systems, Ecole Polyechnique Federal de Lausanne, Lausanne, Switzerland, August 2009.

64. "Using neurally inspired robots to study brain function: Principles and mechanisms" at the symposium on *Models of vision and decision-making: From features to behavior and perceptual robotics* in the 32nd European Conference on Visual Perception (ECVP'09), Regensburg, Germany, August 2009.
65. "Neurorobotics, Brain-Based Devices, and Modeling Cognitive Function", Nour Foundation-Georgetown University Symposium on The Paradox of Neurotechnology, Georgetown University, Washington, DC, May 2009.
66. "Neurorobotics, Neuromodulation, and Modeling Cognitive Function", Sloan-Swartz Center for Theoretical Neurobiology at the Salk Institute, La Jolla, CA, April 2009.
67. "Cognitive Robotics: Studying Cognitive Functions with Embodied Models of the Nervous System", at the Artificial Intelligence and Machine Learning Seminar, Center for Machine Learning and Artificial Intelligence, University of California, Irvine, January 2009.
68. "Neurorobotics and Modeling Cognitive Function" at the Decade of the Mind IV Conference, Santa Ana Pueblo, NM, January 2009.
69. "Cognitive Robotics: Studying Cognitive Functions with Embodied Models of the Nervous System", at the Brain and Technology Summer School, Barcelona, Spain, September 2008.
70. "Neuromodulation and Time-Dependent Plasticity in a Model of Foraging Behavior", *15th Annual Joint Symposium on Neural Computation*, University of California, Irvine, May 2008.
71. "Design Principles and Constraints Underlying the Construction of Brain-Based Devices", RIKEN Brain Science Institute, Saitama, Japan, November 19, 2007.
72. "Brain-Based Devices: Studying Brain Function by Developing Embodied Models of the Nervous System", Mechanical and Aerospace Engineering Department, Cornell University, Ithaca, NY, October 2007.
73. "Brain-Based Devices: Studying Brain Function by Developing Embodied Models of the Nervous System", at the College of Architecture, Art, and Planning, Cornell University, Ithaca, NY, October 2007.
74. "Brain-Based Devices: Studying Brain Function by Developing Embodied Models of the Nervous System", at Hughes Research Laboratories, Malibu, CA, September 2007.
75. Brain-based Devices: Studying Cognitive Functions with Embodied Models of the Nervous System, euCognition the European Network for the Advancement of Artificial Cognitive Systems' Third Six-Monthly Meeting, Munich Airport, 29 June 2007.
76. "Computational Neuroscience", at the Workshop in Cognitive Neuroscience. Centros de Neurosciencias de Cuba, Havana Cuba, June 4-8, 2007.
77. "Brain-based Devices: Studying brain function by developing embodied models of the nervous system", at the Center for Intelligent Systems, Vanderbilt University, April 2007.
78. "Causal Analysis of Large-Scale Embodied Models of the Hippocampus and Cerebellum: Tracing Back Through Time" at the Interdisciplinary Program in Neuroscience Seminar at Georgetown University, November 2006

79. “Principles Underlying the Construction of Brain-Based Devices”, by Jeffrey Krichmar at the Applied Neural Computing workshop, Engineering and Medicine in Biology Conference (EMBC), August 2006, New York, NY.

80. “Principles Underlying the Construction of Brain-Based Devices”, by Jeffrey Krichmar at the Cognitive Robotics, Intelligence, and Control (CogRIC) workshop, August 2006, Windsor, UK.

81. “Principles Underlying the Construction of Brain-Based Devices”, by Jeffrey Krichmar at the Orange County IEEE/ACM Society chapter meeting, July 2006, Irvine, CA.

82. “The Brain as a Complex System: Tools to Analyze Simulated and Real Nervous Systems”, by Jeffrey Krichmar at the DARPA Complex Systems Architectures Workshop, Arlington, Virginia, June 2006.

83. “Analysis of Large-Scale Embodied Neural Models by Tracing Back Through Time”, by Jeffrey Krichmar at the Artificial Life conference workshop on *Neurodynamic Methods for analysis and control of cognitive behaviors*, Bloomington, Indiana, June 2006.

84. “Principles Underlying the Construction of Brain-Based Devices”, by Jeffrey Krichmar at the Adaptation in Artificial and Biological Systems symposium on “GC5: Architecture of Brain and Mind,” Bristol UK, April 2006

85. “Brain-Based Devices for the Study of Nervous Systems and the Development of Intelligent Machines”, by Jeffrey Krichmar at the California State Summer School at University of California at San Diego, July 2005.

86. “Brain-Based Devices for the Study of Nervous Systems and the Development of Intelligent Machines”, by Jeffrey Krichmar at the Robotics/Computer/Computational Intelligence Societies Chapter Meeting, San Diego, CA, May 2005.

87. “Characterizing Hippocampal Pathways in a Brain-Based Device during a Spatial Memory Task”, by Jeffrey Krichmar at the *Ninth International Conference On Cognitive And Neural Systems* in Boston, May 2005.

88. “Object recognition, Adaptive Behavior and Learning in Brain-Based Devices” presented by Jeffrey Krichmar at the *Third International Conference on Development and Learning* in La Jolla, CA, October 2004.

89. “Brain-Based Devices for the Study of Nervous Systems and the Development of Intelligent Machines”, presented by Jeffrey Krichmar at the *Potomac Institute for Policy Studies* in Washington, DC, September 2004.

90. “Engineering of brain-based devices”, presented by Jeffrey Krichmar at the *Information Science and Technology Study Group* in Woods Hole, MA, August 2004.

*91.* “Spatial and Episodic Memory in a Real-World Device Containing a Model of Hippocampal-Cortical Interactions”, presented by Jeffrey Krichmar at the *Neurorobotic Models in Neuroscience and Neuroinformatics* workshop in Los Angeles, CA, July 2004.

92. “Texture discrimination by an autonomous mobile brain-based device with whiskers”, presented by Jeffrey Krichmar at the *IEEE International Conference on Robotics and Automation* in New Orleans, LA, April 2004.

93. "Brain-Based Devices: Studying the Nervous System and Developing Intelligent Machines Based on Neurobiological Principles", by Jeffrey Krichmar at the *Mobile Autonomous Robot Software (MARS) PI Meeting* in New Orleans LA, April, 2004.

94. "Brain-Based Devices for the Study of Nervous Systems and the Development of Intelligent Machines", by Jeffrey Krichmar at the *Augmented Cognition PI Meeting* in Orlando FL, January, 2004.

95. "Visual Binding Through Reentrant Connectivity And Synchronization In A Brain-Based Device", by Jeffrey Krichmar at the *Seventh International Conference On Cognitive And Neural Systems* in Boston, May 2003.

96. "Machine Psychology: Autonomous behavior, perceptual categorization, and conditioning in a brain-based device", by Jeffrey Krichmar at the *International Interdisciplinary Seminar On New Robotics, Evolution And Embodied Cognition* in Lisbon, Portugal. November 2002.

97. "Machine Psychology: Experience-Dependent Perceptual Categorization and Learning in a Brain-Based Device, by Jeffrey Krichmar at the "Experience and Developing Brain Symposium" at the Jean Piaget Society Annual Meeting in Philadelphia, PA. June 2002.

98. "A Neural Approach to Adaptive Behavior and Multi-Sensor Action Selection in a Mobile Device", presented by Jeffrey Krichmar at the 2002 IEEE International Conference on Robotics & Automation, Washington, DC. May 2002.

99. "Categorization And Value Systems As A Means Toward Action Selection In A Brain-Based Device", by J. Krichmar at the Modulation and Modification of Sensor-Motor Coupling workshop in Stirling U.K. February 2002.

100. "Categorization And Value Systems As A Means Toward Action Selection In A Brain-Based Device", by J. Krichmar at the Department of Cybernetic, Reading University, Reading U.K. February 2002.

101. "Visual and Auditory Categorization In A Behaving Real-World Device", by J. Krichmar at the Workshop on Visual and Auditory Categorization In A Behaving Real-World Device, IEEE International Symposium on Computational Intelligence in Robotics and Automation, Banff, Alberta, Canada. July 2001.

102. "Machine psychology: Studying behavior and the brain with devices that explore a real world environment" by J. Krichmar at the Krasnow Institute for Advanced Study at George Mason University, Fairfax, VA. April 2001.

103. "Brain-Based Devices: Studying Behavior and the Nervous System with Devices that Explore a Real World Environment", by J. Krichmar at the 68th Meeting of the Neurosciences Research Program, The Neurosciences Institute, San Diego, CA. March 2001.

104. "Experience-dependent Perceptual Categorization in a Behaving Real-World Device", by J. Krichmar at the Sixth International Conference on Simulation of Adaptive Behavior, Paris, France. September 2000.

105. "The Need for Computational Neuroanatomy: Neuromorphology's Shaping of Neurophysiology.", Computational Neuroanatomy Symposium: Experimental Biology Meeting, April 2000, San Diego, CA.

106. "Oculomotor Indicators of Fatigue and Impairment.", Psychophysiology in Ergonomics Symposium: ANS and CNS Indices of Attention, Workload, and Fatigue. 38th Annual Meeting of the Society for Psychophysiological Research, 1998.

107. "Hippocampus – Larger than Life: Constructing a Large-Scale Model", April 1998, Laboratory of Neural Control, NINDS, National Institute of Health, Washington, DC.

108. "Hippocampus – Larger than Life: Constructing a Large-Scale Model.", February 1998, Krasnow Institute for Advanced Study, George Mason University, Fairfax, VA.

109. "Qualitative reasoning as a modeling tool for computational neuroscience.", June 1997, Mathematical Branch, NIDDK, National Institute of Health, Washington, DC.

## RESEARCH INTERESTS

Autonomous Robots

Neurorobotics

Neuromorphic Engineering

Machine Psychology: Understanding the brain by using real-world behaving devices.

Biologically plausible computer models of learning and memory.

Large-scale computational models of the hippocampus and cerebellum.

Motor control in the oculomotor system.

Fatigue and drug detection.

## PREVIOUS FUNDING

W.M. Keck Foundation

Defense Advanced Research Projects Agency (DARPA)

- Systems of Neuromorphic Adaptive Plastic Scalable Electronics (SyNAPSE)
- Mobile Autonomous Robot Software (MARS)

Intelligence Advanced Research Projects Activity (IARPA)

- Integrated Cognitive-Neuroscience Architectures for Understanding Sensemaking (ICArUS)

Office of Naval Research

National Science Foundation

- Emerging Models and Technologies for Computation
- Robust Intelligence

Qualcomm Incorporated

Northrop Grumman Aerospace Systems

UCI Applied Innovation

## CURRENT FUNDING

Defense Advanced Projects Agency (DARPA)

Intel Corporation

National Science Foundation

Toyota Motors North America

## WORKSHOPS AND MEETINGS ORGANIZED

Steering Committee, 2018 conference on "Technology, Mind & Society", American Psychological Association, Washington DC.

Session Chair, "Advanced Unmanned Systems: Requirements and Groundwork for the Next Generation of Robotics Systems", The 8th International Conference on Applied Human Factors and Ergonomics (AHFE 2017).

Session Chair, "Neuromorphic Circuits & Systems for Robotics", IEEE International Symposium on Circuits and Systems. May 2017.

Organizer of the workshop on *Interacting With Robots Through Touch*, University of California, Irvine, September 2016.

Topic Area leader for "Neuromorphic Path Planning for Robots in a Disaster Response Scenario" at the *Telluride Neuromorphic Cognition Engineering* workshop, July 2016.

Organizer of the IEEE International Conference of Robotics and Automation Workshop on Neurobiologically Inspired Robotics, Hong Kong, June 2014.

Organizer of the 21st *Joint Symposium on Neural Computation*, University of California, Irvine, May 2014.

Co-Organizer of the *15th Annual Joint Symposium on Neural Computation*, University of California, Irvine, May 2008.

Co-Organizer of *Brain-style Robotics: Trends and Perspectives* at The 14th International Conference on Neural Information Processing, Kitakyushu Japan, November 2007.

Organizing committee of the International Workshop on Cognitive Robotics, Intelligence and Control (CogRIC) in Windsor UK, August 2006.

Co-chair of the Segway League at the RoboCup US Open in Atlanta, GA, May 2005.

Co-Organized the *Neurorobotic Models in Neuroscience and Neuroinformatics* workshop at the Eighth International Conference on the Simulation of Adaptive Behavior in Los Angeles, CA, July 2004.

## PROGRAM COMMITTEES

External Review Panel, Sandia National Laboratories.

Chairman, Decade of the Mind Initiative Steering Committee.

7th International Conference on Development and Learning (ICDL-08).

Area Chair, 8th International Conference on Development and Learning (ICDL-09).

SAB 2008 - Simulation of Adaptive Behavior 2008.

ECAL2007 - 9th European Conference on Artificial Life.

**COMMUNITY SERVICE**

| | |
|---|---|
| 2017 | California Alliance for Minority Participation |
| 2016 | Upward Bound, UC Riverside. |
| 2013-Present | The National Academy of Sciences - Science & Entertainment Exchange. |
| 2013-Present | Director, Center for Cognitive Neuroscience and Engineering. |
| 2012 | Stonegate elementary school, Irvine CA. |
| 2011-2012 | Mathobotix |
| 2009 | Chancellors Club – University of California, Irvine |
| 2009 | Falmagne Award Committee |
| 2008 | Robotics Club, Torrey Hills School |
| 2008 | California Forum for Diversity in Graduate Education |
| 2004-2012 | FIRST Lego League Robotics. Awarded for outstanding service as a volunteer. |
| 2003-2009 | *Expanding Your Horizons (EYH) Conference* at the University of California, San Diego (UCSD). Ran workshops on Robotics and Learning to increase the interest of young women in math and science through fun, hands-on learning opportunities. |
| 2002-2007 | *Botball Robotics Mentor/Judge* - a hands-on learning experience in robotics designed to engage students in learning the practical applications of science, technology, engineering and math. |
| 2007 | Rancho Santa Fe Discovery Day |
| 2006 | California State 4-H Leadership Conference, Ran workshop on robotics. |
| 2005-2009 | California State Summer School for Mathematics and Science (COSMOS) |
| 2005 | Community Day, La Jolla Country Day School. |
| 2004-2006 | San Diego Science Alliance RoboExpo – Demonstrated Brain-Based Robotics to Junior High School and High School students and teachers. |

## SOCIETIES

| | |
|---|---|
| 2011 - Present | Biologically Inspired Cognitive Architectures (BICA) Society |
| 1994 - Present | Society for Neuroscience |
| 1996 - 1999 | Association for Research in Vision and Ophthalmology |
| 2000 - Present | Society for Adaptive Behavior |
| 2000 - Present | IEEE Robotics and Automation |

## HONORS AND AWARDS

| | |
|---|---|
| 1979-80 | Varsity Letters in Cross Country, Indoor Track and Outdoor Track |
| 1983 | Dean's List |
| 1990 | Passed Comprehensive Examination with Distinction |
| 1990 | 3.7 GPA at The George Washington University |
| 1996 | Passed Ph.D. Candidacy Examination in Computational Sciences and Informatics at George Mason University |
| 1997 | 3.9 GPA at George Mason University |
| 1998 | President, Potomac Chapter of the Society for Neuroscience |
| 2018 | Entrepreneurial Leader of the Year Nominee, UCI Applied Innovation |