Yoonsuck Choe

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1 Affiliation

- **Professor**, Department of Computer Science and Engineering, Texas A&M University, September 2014–Present
- **Corporate Vice President**, Artificial Intelligence Center, Samsung Research (Samsung Electronics), July 2017–December 2019
- **Associate professor**, Department of Computer Science and Engineering, Texas A&M University, September 2007–August 2014
- **Assistant professor**, Department of Computer Science and Engineering, Texas A&M University, September 2001–August 2007
- **Member of graduate faculty**, School of Graduate Studies, Texas A&M Health Science Center, June 2011–Present.

2 Education

- **Ph.D.**: Department of Computer Science, The University of Texas at Austin (August 2001)
  Dissertation Title: *Perceptual Grouping in a Self-Organizing Map of Spiking Neurons.* Dissertation Advisor: Prof. Risto Miikkulainen.
- **M.A.**: Department of Computer Science, The University of Texas at Austin (December 1995)
  Thesis Title: *Laterally Interconnected Self-Organizing Feature Map in Handwritten Digit Recognition.* Thesis Advisor: Prof. Risto Miikkulainen.
- **B.S.**: Department of Computer Science, Yonsei University, Seoul, Korea (August 1993)
  Report Title: *Visual Programming Using SmallTalk*. Advisor: Prof. Joo S. Song.

3 Honors and Awards

1. Bronze Prize, Samsung Electronics Annual Research Paper Award (Artificial Intelligence category), 2019
2. 30th Anniversary Distinguished Alumni Award (one of 6 recipients), Department of Computer Science, Yonsei University, Seoul, Korea, May 2013.
3. Charles H. Barclay, Jr. ’45 Fellow (College of Engineering Faculty Fellow), Texas A&M University, Spring 2013.
4. Graduate Faculty Teaching Excellence Award, Department of Computer Science and Engineering, Texas A&M University, Spring 2012.
5. President (elected position), Korean Computer Scientists and Engineers Association in America (KOCSEA), January 2010 to December 2010.
6. Senior member, International Neural Networks Society, 2009–
7. Co-author, Best Student Paper Award, IEEE Symposium on Computational Intelligence for Multimedia Signal and Vision Processing, 2009.

Choonseog Park, Yoon H. Bai, and Yoonsuck Choe. Tactile or visual?: Stimulus characteristics determine receptive field type in a self-organizing map model of cortical development. In *Proceedings of the 2009 IEEE Symposium on Computational Intelligence for Multimedia Signal and Vision Processing*, pages 6-13, 2009.

8. Co-author, Best Scientific Paper Award, International Conference on Pattern Recognition, 2008.

   Yoon H. Bai, Choonseog Park, and Yoonsuck Choe. Relative advantage of touch over vision in the exploration of texture. In *Proceedings of the 19th International Conference on Pattern Recognition* (ICPR 2008), pages 1-4, doi: 10.1109/ICPR.2008.4760961, 2008.

9. Big 12 Faculty Fellowship Award, Summer 2006.
10. Graduate Faculty Teaching Excellence Award, Department of Computer Science, Texas A&M University, Spring 2004.

4 Research Interests

Multiscale investigation of brain structure and function:

- Computational neuroscience
  - Dynamic synapses, spiking neurons, thalamocortical circuits, cortical map development and function (visual and tactile), sensorimotor learning and grounding, agent-environment interaction, evolution of memory and prediction.
  - Predictive learning, spike timing and delay learning, self-organization, internal semantics, reinforcement learning, tool construction and tool use.
- Computational neuroanatomy
  - High-resolution, high-throughput, high-volume 3D imaging of the brain for connectomics research.
  - Neuroinformatics for massive amounts of high-resolution brain data.
  - Synthetic connectomics.

5 Experience

5.1 Academia

Head, Neural Intelligence Laboratory, Department of Computer Science, Texas A&M University.

- Duration: 9/2001–present.

Director, Brain Networks Laboratory, Department of Computer Science, Texas A&M University.

- Duration: 9/2001–8/2005 (member), 9/2005–present (director).

Research Assistant, Department of Computer Sciences, The University of Texas at Austin.

- Supervising Professor: Prof. Risto Miikkulainen.
- Duration: 6/1996–8/1996; 6/1997–8/1997; 6/1998–5/1999; 11/1999–1/2001.

Research Assistant, Department of Chemical Engineering, The University of Texas at Austin.

- Supervising Professor: Prof. Roger Bonnecaze.
- Project: Operating system analysis and administration.
- Duration: 6/1995–5/1996.

5.2 Industry

Intern, Exploratory Research & Development Group, Advanced Technology Division, HNC Inc. San Diego (now merged with Fair Isaac).

- Supervisors: Dr. Marc Ilgen and Dr. Joseph Sirosh.
- Project: Text-to-image retrieval system in C, Tcl/Tk, and SWIG using context vectors for text representation and hierarchical self-organizing maps for image representation (DARPA CVIM Project).
- Duration: 6/1999–10/1999.

Database Programmer/Consultant, Doping Control Center, Korea Institute of Science and Technology.

- Supervisor: Dr. Jong-Sei Park.
- Projects: Development of research project management system and scientific bibliography management system.
- Duration: 12/1992–5/1993.

6 Grants

All projects are peer reviewed except for those marked with † (non-peer-reviewed sub-awards and grant supplements). Total grant amount is $\sim$ $2 millon (for non-PI projects, only including subcontract/protated amount).

1. **NSF:** Principal investigator for the project *Enhanced Knife-Edge Scanning Microscopy for Sub-micrometer Imaging of Whole Small Animal Organs*, #1256086, 6/1/2013–5/31/2015. $502,746. (Choe: 33%)
2. **NSF:** Principal investigator for the project *CRCNS: Data Sharing: Open Web Atlas for High-Resolution 3D Mouse Brain Data*, #1208174, 9/1/2012–8/31/2014. $200,868. (Choe: 33%)
3. † **King Abdullah University of Science and Technology (KAUST):** Application researcher (sub-award) for the *Institute for Applied Mathematics and Computational Science* (theme: computational bioscience), Award No. KUS-C1-016-04, 9/1/2010–4/30/2012. $\sim$$26,000 (Choe 100%; direct cost; sub-award only).
4. **NSF: Completed** Principal investigator for the project *CRCNS data sharing: Whole Mouse Brain Neuronal Morphology and Neurovascular Browser*, #0905041, 9/1/2009–8/31/2011. $114,024. (Choe: 33%)
5. † **Agency for Defense Development (Korea), sub-award to Realtime Visual Co.:** Principal investigator for the project *Evolving Autonomous Agents and Scenarios to Support Interactive Training*, 6/1/2009–6/31/2010. $100,000. (Choe: 100%)
6. **NIH/NINDS:** Principal investigator for the project *MSM: Multiscale Imaging, Analysis, and Integration of Brain Networks* (Co-PIs: Louise C. Abbott, John Keyser, Bruce H. McCormick), #1R01-NS54252, 9/2005 – 5/2008. $965,992 (Choe: $\sim$20%;$300,000 subcontracted to Stanford, PI: Stephen J. Smith).
   - † Supplemental funding for equipment support. 9/2005–5/2008. $20,000.
7. **NIH/NIMH:** Principal investigator for the subcontracted portion of the project *Computational modeling of cortical maps*, #1R01-MH66991, 3/2002 – 2/2005. PI: Risto Miikkulainen (The University of Texas at Austin).
8. **Texas Higher Education Coordinating Board (ATP)**: Co-principal investigator for the project *On the statistical/bio-physical extraction of textural features of imagery databases,* Program #000512-0217-2001, 1/1/2002 – 12/31/2003. PI: Jyh-Charn Liu. $100,000 (Choe: 50%).

7 Publications

7.1 Books

The "*" mark indicates students supervised by Yoonsuck Choe.

1. Morabito, C. F., Alippi, C., **Choe, Y.**, and Kozma, R., editors (2018). *Artificial Intelligence in the Age of Neural Networks and Brain Computing*. Amsterdam, Netherlands: Elsevier.

2. Lee, K., and **Choe, Y.** (2011). *Elements of Computer Science*. Seoul, Korea: KNOU Press. In Korean. 393 pages.

3. Miikkulainen, R., Bednar, J. A., **Choe, Y.**, and Sirosh, J. (2005). *Computational Maps in the Visual Cortex*. Berlin: Springer. URL: http://www.computationalmaps.org. 538 pages.

4. Sirosh, J., Miikkulainen, R., and **Choe, Y.**, editors (1996). *Lateral Interactions in the Cortex: Structure and Function*. Austin, TX: The UTCS Neural Networks Research Group. Electronic book, ISBN 0-9647060-0-8, http://www.cs.utexas.edu/users/nn/web-pubs/htmlbook96.

7.2 Journals

The "*" mark indicates students supervised by Yoonsuck Choe.

1. Wang, Y., Zhang, X., Lu, M., Wang, H., and **Choe, Y.** (2019). Attention augmentation with multi-residual in bidirectional LSTM. *Neurocomputing*.

2. Kim, J., **Choe, Y.**, and Mueller, K. (2015). Extracting clinical relations in electronic health records using enriched parse trees. *Procedia Computer Science*, 53:274–283.

3. Zhang, Y., Li, P., Jin, Y., and **Choe, Y.** (2015). A digital liquid state machine with biologically inspired learning and its application to speech recognition. *IEEE Transactions on Neural Networks and Learning Systems*, 26:2635–2649.

4. Yoo*, J., Kwon*, J., and **Choe, Y.** (2014). Predictable internal brain dynamics in EEG and its relation to conscious states. *Frontiers in Neurorobotics*, 8(00018).

5. Yu*, Y., Gutierrez-Osuna, R., and **Choe, Y.** (2014). Context-sensitive intra-class clustering. *Pattern Recognition Letters*, 37:85–93.

6. Choi*, H., Choi, S., and **Choe, Y.** (2013). Parameter learning for alpha-integration. *Neural Computation*, 25:1585–1604.

7. Mann*, T. A., Park, Y., Jeong, S., Lee, M., and **Choe, Y.** (2013). Autonomous and interactive improvement of binocular visual depth estimation through sensorimotor interaction. *IEEE Transactions on Autonomous Mental Development*, 5:74–84.

8. Park, J., Kim, S., Park, S. I., **Choe, Y.**, Li, J., and Han, A. (2013). A microchip for quantitative analysis of CNS axon growth under localized biomolecular treatments. *Journal of Neuroscience Methods*, 221:166–174.

9. **Choe, Y.**, Kwon*, J., and Chung*, J. R. (2012). Time, consciousness, and mind uploading. *International Journal on Machine Consciousness*, 4:257–274.

10. **Choe, Y.**, and Mann*, T. A. (2012). From problem solving to problem posing. *Brain-Mind Magazine*, 1:7–8.

11. Mann*, T. A., and **Choe, Y.** (2012). Directed exploration in reinforcement learning with transferred knowledge. *Journal of Machine Learning Research: Workshop and Conference Proceedings*, 24:59–76.

12. **Choe, Y.**, Mayerich, D., Kwon*, J., Miller, D. E., Sung*, C., Chung*, J. R., Huffman, T., Keyser, J., and Abbott, L. C. (2011). Specimen preparation, imaging, and analysis protocols for knife-edge scanning microscopy. *Journal of Visualized Experiments*, 58:e3248. doi: 10.3791/3248.

13. Chung*, J. R., and **Choe, Y.** (2011). Emergence of memory in reactive agents equipped with environmental markers. *IEEE Transactions on Autonomous Mental Development*, 3:257–271.

14. Chung*, J. R., Sung*, C., Mayerich, D., Kwon*, J., Miller, D. E., Huffman, T., Abbott, L. C., Keyser, J., and **Choe, Y.** (2011). Multiscale exploration of mouse brain microstructures using the knife-edge scanning microscope brain atlas. *Frontiers in Neuroinformatics*, 5:29.

15. Mayerich, D., Kwon*, J., Sung*, C., Abbott, L. C., Keyser, J., and **Choe, Y.** (2011). Fast macro-scale transmission imaging of microvascular networks using KESM. *Biomedical Optics Express*, 2:2888–2896.

16. Kwon*, J., and **Choe, Y.** (2009). Facilitating neural dynamics for delay compensation: A road to predictive neural dynamics?. *Neural Networks*, 22:267–276.

17. Lim*, H., and **Choe, Y.** (2008). Extrapolative delay compensation through facilitating synapses and its relation to the flash-lag effect. *IEEE Transactions on Neural Networks*, 19:1678–1688.

18. Xiong*, H., and **Choe, Y.** (2008*a*). Dynamic pathway analysis. *BMC Systems Biology*, 2:9. 17 pages (online open-access journal).

19. Xiong*, H., and **Choe, Y.** (2008*b*). Structural systems identification of genetic regulatory networks. *Bioinformatics*, 24:553–560.

20. Yu*, Y., and **Choe, Y.** (2008). Neural model of disinhibitory interactions in modified Poggendorff illusion. *Biological Cybernetics*, 98:75–85.

21. **Choe, Y.**, Yang*, H.-F., and Eng*, D. C.-Y. (2007). Autonomous learning of the semantics of internal sensory states based on motor exploration. *International Journal of Humanoid Robotics*, 4:211–243.

22. Oh*, S., and **Choe, Y.** (2007). Segmentation of textures defined on flat vs. layered surfaces using neural networks: Comparison of 2D vs. 3D representations. *Neurocomputing*, 70:2245–2255.

23. Lim*, H., and **Choe, Y.** (2006). Compensating for neural transmission delay using extrapolatory neural activation in evolutionary neural networks. *Neural Information Processing–Letters and Reviews*, 10:147–161.

24. Yu*, Y., and **Choe, Y.** (2006). A neural model of the scintillating grid illusion: Disinhibition and self-inhibition in early vision. *Neural Computation*, 18:521–544.

25. Bednar, J. A., **Choe, Y.**, Paula, J. D., Miikkulainen, R., Provost, J., and Tversky, T. (2004). Modeling cortical maps with Topographica. *Neurocomputing*, 58–60:1129–1135.

26. **Choe, Y.** (2004). The role of temporal parameters in a thalamocortical model of analogy. *IEEE Transactions on Neural Networks*, 15:1071–1082.

27. **Choe, Y.**, and Miikkulainen, R. (2004). Contour integration and segmentation in a self-organizing map of spiking neurons. *Biological Cybernetics*, 90:75–88.

28. McCormick, B. H., **Choe, Y.**, Koh, W., Abbott, L. C., Keyser, J., Melek, Z., Doddapaneni, P., and Mayerich, D. (2004). Construction of anatomically correct models of mouse brain networks. *Neurocomputing*, 58–60:379–386.

29. **Choe, Y.** (2003). Analogical cascade: A theory on the role of the thalamo-cortical loop in brain function. *Neurocomputing*, 52–54:713–719.

30. **Choe, Y.**, and Miikkulainen, R. (2003). The role of postsynaptic potential decay rate in neural synchrony. *Neurocomputing*, 52–54:707–712.

31. **Choe, Y.**, Miikkulainen, R., and Cormack, L. K. (2000). Effects of presynaptic and postsynaptic resource redistribution in Hebbian weight adaptation. *Neurocomputing*, 32–33:77–82.

32. **Choe, Y.**, and Miikkulainen, R. (1998). Self-organization and segmentation in a laterally connected orientation map of spiking neurons. *Neurocomputing*, 21:139–157.

7.3 Book Chapters

The "*" mark indicates students supervised by Yoonsuck Choe.

1. **Choe, Y.** (2018). Meaning vs. information, prediction vs. memory, and question vs. answer. In Morabito, C. F., Alippi, C., **Choe, Y.**, and Kozma, R., editors, *Artificial Intelligence in the Age of Neural Networks and Brain Computing*, In press. Amsterdam, Netherlands: Elsevier.

2. **Choe, Y.** (2015*a*). Anti-Hebbian learning. In Jaeger, D., and Jung, R., editors, *Encyclopedia of Computational Neuroscience*, 191–193. New York: Springer. First edition.

3. **Choe, Y.** (2015*b*). Brain atlases. In Jaeger, D., and Jung, R., editors, *Encyclopedia of Computational Neuroscience*, 434. New York: Springer. First edition.

4. **Choe, Y.** (2015*c*). Computational neuroanatomy: Overview. In Jaeger, D., and Jung, R., editors, *Encyclopedia of Computational Neuroscience*, 24–26. New York: Springer. First edition.

5. **Choe, Y.** (2015*d*). Connectome, general. In Jaeger, D., and Jung, R., editors, *Encyclopedia of Computational Neuroscience*, 798–806. New York: Springer. First edition.

6. **Choe, Y.** (2015*e*). Hebbian learning. In Jaeger, D., and Jung, R., editors, *Encyclopedia of Computational Neuroscience*, 1305–1309. New York: Springer. First edition.

7. **Choe, Y.** (2015*f*). Physical sectioning microscopy. In Jaeger, D., and Jung, R., editors, *Encyclopedia of Computational Neuroscience*, 2376–2379. New York: Springer. First edition.

8. **Choe, Y.**, Kwon*, J., Mayerich, D., and Abbott, L. C. (2015). Connectome, mouse. In Jaeger, D., and Jung, R., editors, *Encyclopedia of Computational Neuroscience*, 807–810. New York: Springer. First edition.

9. Mayerich, D., **Choe, Y.**, and Keyser, J. (2015). Reconstruction, techniques and validation. In Jaeger, D., and Jung, R., editors, *Encyclopedia of Computational Neuroscience*, 2591–2593. New York: Springer. First edition.

10. Chung*, J. R., Kwon*, J., Mann*, T. A., and **Choe, Y.** (2012). Evolution of time in neural networks: From the present to the past, and forward to the future. In Rao, A. R., and Cecchi, G. A., editors, *The Relevance of the Time Domain to Neural Network Models, Springer Series in Cognitive and Neural Systems 3*, 99–116. New York: Springer.

11. **Choe, Y.**, Abbott, L. C., Han*, D., Huang, P.-S., Keyser, J., Kwon*, J., Mayerich, D., Melek, Z., and McCormick, B. H. (2009). Knife-edge scanning microscopy: High-throughput imaging and analysis of massive volumes of biological microstructures. In Rao, A. R., and Cecchi, G., editors, *High-Throughput Image Reconstruction and Analysis: Intelligent Microscopy Applications*, 11–37. Boston, MA: Artech House.

12. Misra*, N., and **Choe, Y.** (2007). Shape recognition through dynamic motor representations. In Kozma, R., and Perlovsky, L., editors, *Neurodynamics of Higher-Level Cognition and Consciousness*, 185–210. Berlin: Springer.

13. Miikkulainen, R., Bednar, J. A., **Choe, Y.**, and Sirosh, J. (1999). Modeling self-organization in the visual cortex. In Oja, E., and Kaski, S., editors, *Kohonen Maps*. New York: Elsevier.

14. Miikkulainen, R., Bednar, J. A., **Choe, Y.**, and Sirosh, J. (1997). Self-organization, plasticity, and low-level visual phenomena in a laterally connected map model of the primary visual cortex. In Goldstone, R. L., Schyns, P. G., and Medin, D. L., editors, *Perceptual Learning*, vol. 36 of *Psychology of Learning and Motivation*, 257–308. San Diego, CA: Academic Press.

7.4 Commentaries and editorials: not peer-reviewed

The "*" mark indicates students supervised by Yoonsuck Choe.

1. Mann*, T. A., and **Choe, Y.** (2010). Grounding the meaning of nonprototypical smiles on motor behavior. *Behavioral and Brain Sciences*, 33:453–454. Commentary on Niedenthal et al. (same volume).

2. **Choe, Y.**, and Lee, M. (2006). Guest editorial for volume 10 numbers 4-6: Special issue on bio-inspired models and hardware. *Neural Information Processing–Letters and Reviews*, 10:59–60.

3. **Choe, Y.** (2005*a*). A deeper semantic role for the mirror system. *Behavioral and Brain Sciences*, 28. (On-line supplemental commentary on Arbib (2005) *Behavioral and Brain Sciences*, 28:105–167.).

4. **Choe, Y.** (2005*b*). How neural is the neural blackboard architecture?. *Behavioral and Brain Sciences*, 29:72–73. (Commentary on van der Velde and de Kamps (2006) *Behavioral and Brain Sciences*, 29:37–108.) 2 pages.

7.5 Commentaries and editorials: peer-reviewed

The "*" mark indicates students supervised by Yoonsuck Choe.

1. Maniadakis, M., Wittmann, M., Droit-Volet, S., and **Choe, Y.** (2014). Toward embodied artificial cognition: TIME is on my side. *Frontiers in neurorobotics*, 8:25.

7.6 Conference and Workshop Proceedings

The "*" mark indicates students supervised by Yoonsuck Choe.

1. Kim, J., Park*, C., Jung, H.-J., and **Choe, Y.** (2020). Plug-in, trainable gate for streamlining arbitrary neural networks. In *Proceedings of the AAAI Conference on Artificial Intelligence*.

2. Jung, H.-J., Kim, J., and **Choe, Y.** (2019). How compact?: Assessing compactness of representations through layer-wise pruning. In *AAAI 2019 Workshop on Network Interpretability for Deep Learning*.

3. Lee, S.-G., Kim, J., Jung, H.-J., and **Choe, Y.** (2019). Comparing sample-wise learnability across deep neural network models. In *Proceedings of the AAAI Conference on Artificial Intelligence (Student Abstract)*, vol. 33, 9961–9962.

4. Nguyen, K. N., Yoo*, J., and **Choe, Y.** (2019). Speeding up affordance learning for tool use, using proprioceptive and kinesthetic inputs. In *2019 International Joint Conference on Neural Networks (IJCNN)*, 1–8. IEEE.

5. Nowak, M. R., Lee, J., and **Choe, Y.** (2019). A queryable graph representation of vascular connectivity in the whole mouse brain. In *2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 256–260. IEEE.

6. Wang, Y., Wang, H., Zhang, X., Chaspari, T., **Choe, Y.**, and Lu, M. (2019). An attention-aware bidirectional multi-residual recurrent neural network (abmrnn): A study about better short-term text classification. In *ICASSP 2019-2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 3582–3586. IEEE.

7. Lee, J., Yoo*, J., and **Choe, Y.** (2018). Tracing and analysis of the whole mouse brain vasculature with systematic cleaning to remove and consolidate erroneous images. In *Proceedings of the 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. In press.

8. Nowak, M., and **Choe, Y.** (2018*a*). Data-driven synthetic cerebrovascular models for validation of segmentation algorithms. In *Proceedings of the 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. In press.

9. Nowak, M., and **Choe, Y.** (2018*b*). Towards an open-source framework for the analysis of cerebrovasculature structure. In *Proceedings of the 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. In press.

10. Lee, J., An, W., and **Choe, Y.** (2017). Mapping the full vascular network in the mouse brain at submicrometer resolution. In *Engineering in Medicine and Biology Society (EMBC), 2017 39th Annual International Conference of the IEEE*, 3309–3312. IEEE.

11. Nguyen, K., and **Choe, Y.** (2017). Dynamic control using feedforward networks with adaptive delay and facilitating neural dynamics. In *Proceedings of the International Joint Conference on Neural Networks*. In press.

12. Nguyen, K. N., Liu, X., Komogortsev, O., Gutierrez-Osuna, R., and **Choe, Y.** (2017). Explanation of the perceptual oblique effect based on the fidelity of oculomotor control during saccades. In *Proceedings of the International Conference on Development and Learning*, In press.

13. Reams, R., and **Choe, Y.** (2017). Emergence of tool construction in an articulated limb controlled by evolved neural circuits. In *Proceedings of the International Joint Conference on Neural Networks*. In press.

14. Sung*, C., Higgins, C., Zhang, B., and **Choe, Y.** (2017). Evaluating deep learning in churn prediction for everything-as-a-service in the cloud. In *Proceedings of the International Joint Conference on Neural Networks*. In press.

15. An, W. K., and **Choe, Y.** (2016). Automated reconstruction of neurovascular networks in Knife-Edge Scanning Microscope rat brain Nissl data set. In *Proceedings of the 12th International Symposium on Visual Computing*. In press.

16. Freitag, M., and **Choe, Y.** (2016). Analysis of tool use strategies in evolved neural circuits controlling an articulated limb. In *Proceedings of the International Joint Conference on Neural Networks*. In press.

17. Lim*, S., Nowak, M., and **Choe, Y.** (2016). Automated neurovascular tracing and analysis of the knife-edge scanning microscope rat nissl data set using a computing cluster. In *Proceedings of the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. In press.

18. Miller, D. E., Shah, R., Zhang, W., Yoo*, J., Kwon*, J., Mayerich, D., Keyser, J., Abbott, L. C., and **Choe, Y.** (2016). Fast submicrometer-scale imaging of whole zebrafish using the knife-edge scanning microscope. In *Proceedings of the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. In press.

19. Nowak, M., and **Choe, Y.** (2016). Learning to distinguish cerebral vasculature data from mechanical chatter in india-ink images acquired using knife-edge scanning microscopy. In *Proceedings of the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. In press.

20. Nowak, M., Lozovskiy, A., Dobroskok, D., and **Choe, Y.** (2016). Knife-edge scanning microscopy for in silico study of cerebral blood flow: from biological imaging data to flow simulations. In *Proceedings of the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. In press.

21. Parulkar, A., and **Choe, Y.** (2016). Motor-based autonomous grounding in a model of the fly optic flow system. In *Proceedings of the International Joint Conference on Neural Networks*. In press.

22. Sung*, C., Zhang, B., Higgins, C., and **Choe, Y.** (2016). Data-driven sales leads prediction for everything-as-a-service in the cloud. In *Proceedings of the 3rd IEEE International Conference on Data Science and Advanced Analytics*. In press.

23. Wang, H., Yoo*, J., Li*, Q., and **Choe, Y.** (2016). Dynamical analysis of recurrent neural circuits in articulated limb controllers for tool use. In *Proceedings of the International Joint Conference on Neural Networks*. In press.

24. **Choe, Y.**, Yoo*, J., and Li*, Q. (2015). Tool construction and use challenge: Tooling test rebooted. In *AAAI-15 Workshop on Beyond the Turing Test*. 2 pages.

25. Lal Das, S., Keyser, J., and **Choe, Y.** (2015). Random-forest-based automated cell detection in knife-edge scanning microscope rat nissl data. In *Proceedings of the International Joint Conference on Neural Networks*. DOI: 10.1109/IJCNN.2015.7280852.

26. Li*, Q., Yoo*, J., and **Choe, Y.** (2015). Emergence of tool use in an articulated limb controlled by evolved neural circuits. In *Proceedings of the International Joint Conference on Neural Networks*. DOI: 10.1109/IJCNN.2015.7280564.

27. Yamauchi, T., Seo, H., **Choe, Y.**, Bowman, C., and Xiao, K. (2015). Assessing emotions by cursor motions: An affective computing approach. In *Proceedings of the 36th Annual Conference of the Cognitive Science Society*. In press.

28. Zhang, W., Yoo*, J., Keyser, J., Abbott, L. C., and **Choe, Y.** (2015). Real-time detection of imaging errors in the knife-edge scanning microscope through change detection. In *Proceedings of the 2015 IEEE 12th International Symposium on Biomedical Imaging*, 177–181.

29. Yoo*, J., Choi*, J., and **Choe, Y.** (2014). Development of target reaching gesture map in the cortex and its relation to the motor map: A simulation study. In *Advances in Self-Organizing Maps and Learning Vector Quantization: Proceedings of the 10th International Workshop, WSOM 2014, Mittweida, Germany, July 2–4, 2014*, 187–197. Heidelberg: Springer.

30. Sung*, C., Woo, J., Goodman, M., Huffman, T., and **Choe, Y.** (2013). Scalable, incremental learning with MapReduce parallelization for cell detection in high-resolution 3D microscopy data. In *Proceedings of the International Joint Conference on Neural Networks*, 434–440.

31. Mann*, T. A., and **Choe, Y.** (2012). Directed exploration in reinforcement learning with transferred knowledge. In *Proceedings of the 10th European Workshop on Reinforcement Learning*.

32. **Choe, Y.** (2011). Action-based autonomous grounding. In Modayil, J., Precup, D., and Singh, S., editors, *AAAI-11 Workshop on Lifelong Learning from Sensorimotor Experience*, 56–57. Palo Alto, CA: AAAI Press. AAAI Workshop Technical Report WS-11-15.

33. **Choe, Y.**, Mayerich, D., Kwon*, J., Miller, D. E., Chung*, J. R., Sung*, C., Keyser, J., and Abbott, L. C. (2011). Knife-edge scanning microscopy for connectomics research. In *Proceedings of the International Joint Conference on Neural Networks*, 2258–2265. Piscataway, NJ: IEEE Press.

34. Kwon*, J., Mayerich, D., and **Choe, Y.** (2011). Automated cropping and artifact removal for knife-edge scanning microscopy. In *Proceedings of the IEEE International Symposium on Biomedical Imaging*, 1366–1369.

35. Mann*, T. A., and **Choe, Y.** (2011). Scaling up reinforcement learning through targeted exploration. In *Proceedigs of the Twenty-Fifth AAAI Conference on Artificial Intelligence*, 435–440.

36. Mann*, T. A., Park, Y., Jeong, S., Lee, M., and **Choe, Y.** (2011). Autonomously improving binocular depth estimation. In *The 21st Annual Conference of the Japanese Neural Network Society*. P2-15 [online].

37. Mayerich, D., Kwon*, J., Panchal*, A., Keyser, J., and **Choe, Y.** (2011). Fast cell detection in high-throughput imagery using gpu-accelerated machine learning. In *Proceedings of the IEEE International Symposium on Biomedical Imaging*, 719–723.

38. Yang*, H.-F., and **Choe, Y.** (2011*a*). Ground truth estimation by maximizing topological agreements in electron microscopy data. In *Proceedings of the 7th International Symposium on Visual Computing (LNCS 6938)*, 371–380.

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82. **Choe, Y.**, and Miikkulainen, R. (1997*b*). Self-organization and segmentation with laterally connected spiking neurons. In *Proceedings of the 15th International Joint Conference on Artificial Intelligence*, 1120–1125. San Francisco, CA: Morgan Kaufmann.

83. **Choe, Y.**, Sirosh, J., and Miikkulainen, R. (1996). Laterally interconnected self-organizing maps in hand-written digit recognition. In Touretzky, D. S., Mozer, M. C., and Hasselmo, M. E., editors, *Advances in Neural Information Processing Systems 8*, 736–742. Cambridge, MA: MIT Press.

7.7 Conference and Workshop Proceedings: Non-Peer-Reviewed

The "*" mark indicates students supervised by Yoonsuck Choe.

1. Yang*, H.-F., and **Choe, Y.** (2007). Co-development of visual receptive fields and their motor-primitive-based decoding scheme. In *Proceedings of the International Joint Conference on Neural Networks 2007 Post conference Workshop on Biologically-inspired Computational Vision (BCV) 2007*.

2. Xiong*, H., and **Choe, Y.** (2006). Significantly different dynamic behaviors of biological networks between normal and abnormal cells in response to perturbation of environmental stressors and drugs. In *Engineering Principles in Biological Systems (Cold Spring Harbor Laboratory, New York, December 3–6, 2006)*, 52.

7.8 Thesis and Dissertation

The "*" mark indicates students supervised by Yoonsuck Choe.

1. **Choe, Y.** (2001). *Perceptual Grouping in a Self-Organizing Map of Spiking Neurons*. PhD thesis, Department of Computer Sciences, The University of Texas at Austin, Austin, TX. Technical Report AI01-292.

2. **Choe, Y.** (1995). *Laterally Interconnected Self-Organizing Feature Map in Handwritten Digit Recognition*. Master's thesis, Department of Computer Sciences, The University of Texas at Austin. Technical Report AI95-236.

7.9 Abstracts

The "*" mark indicates students supervised by Yoonsuck Choe.

1. Sung*, C., Mayerich, D., Kwon*, J., Miller, D. E., Abbott, L. C., Keyser, J., Huffman, T., and **Choe, Y.** (2012). Web-based knife-edge scanning microscope brain atlas in vector-graphics for enhanced performance. In *Neuroscience Meeting Planner, New Orleans, LA: Society for Neuroscience*. Program No. 328.05. Online.

2. Sung*, C., Chung*, J. R., Mayerich, D., Kwon*, J., Miller, D. E., Huffman, T., Keyser, J., Abbott, L. C., and **Choe, Y.** (2011). Knife-edge scanning microscope brain atlas: A submicrometer-resolution web-based mouse brain atlas. In *Neuroscience Meeting Planner, Washington, DC: Society for Neuroscience*. Program No. 328.05. Online.

3. **Choe, Y.**, Abbott, L. C., Miller, D. E., Han*, D., Yang*, H.-F., Chung*, J. R., Sung*, C., Mayerich, D., Kwon*, J., Micheva, K., and Smith, S. J. (2010*a*). Multiscale imaging, analysis, and integration of mouse brain networks. In *Neuroscience Meeting Planner, San Diego, CA: Society for Neuroscience*. Program No. 516.3. Online.

4. **Choe, Y.**, Abbott, L. C., Ponte, G., Keyser, J., Kwon*, J., Mayerich, D., Miller, D., Han*, D., Grimaldi, A. M., Fiorito, G., Edelman, D. B., and McKinstry, J. L. (2010*b*). Charting out the octopus connectome at submicron resolution using the knife-edge scanning microscope. *BMC Neuroscience*, 11(Suppl 1):P136. Nineteenth Annual Computational Neuroscience Meeting: CNS*2010.

5. Choi*, H., and **Choe, Y.** (2010). Simultaneous grounding and receptive field learning in visuomotor agents. *BMC Neuroscience*, 11(Suppl 1):P89. Nineteenth Annual Computational Neuroscience Meeting: CNS*2010.

6. Mann*, T. A., and **Choe, Y.** (2010). Neural conduction delay forces the emergence of predictive function in an evolving simulation. *BMC Neuroscience*, 11(Suppl 1):P62. Nineteenth Annual Computational Neuroscience Meeting: CNS*2010.

7. Yang*, H.-F., and **Choe, Y.** (2010). Reconstruction of neuronal morphologies from electron microscopy images using graph cuts. *BMC Neuroscience*, 11(Suppl 1):P142. Nineteenth Annual Computational Neuroscience Meeting: CNS*2010.

8. **Choe, Y.**, Han*, D., Huang, P.-S., Keyser, J., Kwon*, J., Mayerich, D., and Abbott, L. C. (2009). Complete submicrometer scans of mouse brain microstructure: Neurons and vasculatures. In *Neuroscience Meeting Planner, Chicago, IL: Society for Neuroscience*. Program No. 389.10. Online.

9. Park*, C., Choi*, H., and **Choe, Y.** (2009). Textural-input-driven self-organization of tactile receptive fields. *BMC Neuroscience*, Suppl 1:P62. Eighteenth Annual Computational Neuroscience Meeting: CNS*2009.

10. **Choe, Y.**, and Yang*, H.-F. (2008). Decoding spikes without stimulus information: Its implications on receptive-field learning. In *Proceedings of the 5th Computational and Systems Neuroscience Meeting (COSYNE 2008 Abstracts)*, 267.

11. **Choe, Y.**, Abbott, L. C., Keyser, J., Kwon*, J., Mayerich, D. M., Melek, Z., and McCormick, B. H. (2007). Enhanced microvascular staining and tracing in large volumes of mouse brain tissue. In *Neuroscience Meeting Planner, San Diego, CA: Society for Neuroscience*. Program No. 845.14. Online.

12. Mayerich, D. M., Abbott, L. C., **Choe, Y.**, Han*, D., Keyser, J., Melek, Z., and McCormick, B. H. (2007). Efficient methods for tracing and visualization of neural morphology in microscopy image stacks. In *Neuroscience Meeting Planner, San Diego, CA: Society for Neuroscience*. Program No. 845.2. Online.

13. **Choe, Y.**, and Yang*, H.-F. (2006). Co-development of visual receptive fields and their motor primitive-based decoding scheme. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 734.6. Online.

14. McCormick, B. H., Abbott, L. C., Mayerich, D. M., , Keyser, J., Kwon*, J., Melek, Z., and **Choe, Y.** (2006). Full-scale submicron neuroanatomy of the mouse brain. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 694.5. Online.

15. Bednar, J. A., **Choe, Y.**, Paula, J. D., Miikkulainen, R., and Provost, J. (2005*a*). Modeling the visual cortex using the topographica cortical map simulator. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 508.1.

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17. **Choe, Y.**, and Yu*, Y. (2005). Propagation of the results of cortical computation through the thalamocortical loop: Involvement of corticothalamic feedback and the thalamic reticular nucleus. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 274.11. Online.

18. Lim*, H., and **Choe, Y.** (2005). Extrapolative role of facilitating synapses in the compensation of neural delay. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 41.19. Online.

19. McCormick, B. H., Busse, B. L., Mayerich, D. M., Abbott, L. C., **Choe, Y.**, Keyser, J., Smith, S. J., and Denk, W. (2005*a*). Biologically accurate modeling of mouse brain requires biologically accurate networks. *Microscopy and Microanalysis*, 11 (Supplement 2):66–67.

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21. Yu*, Y., and **Choe, Y.** (2005). Asymptotic stability analysis of the thalamocortical circuit. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 274.23. Online.

22. **Choe, Y.** (2004). Role of the thalamic reticular nucleus in selective propagation of the results of cortical computation. In *Cortical Function: A View from the Thalamus*. Abstract p. 21.

23. **Choe, Y.**, McCormcik, B. H., and Koh, W. (2004). Network connectivity analysis on the temporally augmented *c. elegans* web: A pilot study. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 921.9. Online.

24. McCormick, B. H., Mayerich, D. M., Abbott, L. C., Gutierrez-Osuna, R., Keyser, J., **Choe, Y.**, Koh, W., and Busse, B. L. (2004). Whole mouse brain mapped at submicron resolution using Knife-Edge Scanning Microscope. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 1033.4. Online.

25. Miikkulainen, R., Bednar, J. A., and **Choe, Y.** (2004). Sparse, redundancy-reduced visual coding through self-organized lateral connections. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 490.3. Online.

26. Yu*, Y., and **Choe, Y.** (2004). Explaining the scintillating grid illusion using disinhibition and self-inhibition in the early visual pathway. In *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience. Program No. 301.10. Online.

7.10 Technical Reports

The "*" mark indicates students supervised by Yoonsuck Choe.

1. **Choe, Y.** (2003). The role of temporal parameters in a thalamocortical model of analogy. Technical Report 2003-8-5, Department of Computer Science, Texas A&M University.

2. **Choe, Y.**, and Bhamidipati*, S. K. (2003). Learning the meaning of neural spikes through sensory-invariance driven action. Technical Report 2003-8-3, Department of Computer Science, Texas A&M University.

3. **Choe, Y.**, and Sarma*, S. (2003). Relationship between suspicious coincidence in natural images and oriented filter response distributions. Technical Report 2003-8-4, Department of Computer Science, Texas A&M University.

4. Yu*, Y., and **Choe, Y.** (2003). Modeling disinhibition in the early visual pathway. Technical Report 2003-8-6, Department of Computer Science, Texas A&M University.

5. **Choe, Y.** (2002). Active representations: A primitive for analogical computing in the brain. Technical Report 2002-1-3, Department of Computer Science, Texas A&M University. 6 pages.

6. **Choe, Y.**, and Miikkulainen, R. (2000). Contour integration and segmentation with self-organized lateral connections. Technical Report AI2000-286, Department of Computer Sciences, The University of Texas at Austin.

7. **Choe, Y.**, and Miikkulainen, R. (1996). Self-organization and segmentation with laterally connected spiking neurons. Technical Report AI96-251, Department of Computer Sciences, The University of Texas at Austin.

8 Talks and Presentations

8.1 Talks

1. Invited Talk: *Inside vs. Outside in Neuroscience and AI* , Society for Computational Neuroscience, Seoul, Korea. 12/2/2019.

2. Invited Talk: *Overcoming Limitations of Deep Learning* , Samsung AI Center Cambridge, Cambridge, UK. 9/25/2019.

3. Invited Talk: *Understanding the Brain, From Within*. Whole Brain Emulation Workshop, 2019. Online. 6/1/2019.

4. Invited Talk: *Overcoming Limitations of Deep Learning*, AI Center, Seoul National University, Seoul, Korea. 5/2/2019.

5. Invited Lecture: *Demystifying Deep learning*, Industry Perspectives Lecture Series, Seoul National University, Seoul, Korea. 3/25/2019.

6. Invited Talk: *Understanding Deep Networks: From Within and From Without*, 18th China-Japan-Korea Joint Workshop on Neurobiology and Neuroinformatics (NBNI2018), Jeju, Korea. 10/15/2018.

7. Invited Talk: *Overcoming Limitations of Deep Learning*, Colloquim Series, KAIST Bio and Brain Engineering Department, Daejeon, Korea. 4/25/2018

8. Invited Talk: *Overcoming Limitations of Deep Learning*, Yonsei University, Seoul, Korea. 3/13/2018.

9. Invited Talk: *Meaning and Consciousness in the Brain Unraveled Through Machine Learning*, 2017 Brain and AI Summer Workshop, Busan, Korea. 7/6/2017.

10. Invited Talk: *Tool Construction and Use in an Articulated Limb Controlled by Evolved Neural Networks*, Korea AI Flagship Project Workshop, Busan, Korea. 7/4/2017.

11. Invited Talk: *Motor Aspect of Visual Perception*, Electronics and Telecommunications Research Institute, Daejeon, Korea. 6/26/2017.

12. Invited Talk: *Tool Construction and Use in an Articulated Limb Controlled by Evolved Neural Networks*, Korea Institute for Advance Studies, Korea, Seoul, Korea. 6/19/2017.

13. Invited Talk: *Questioning Questions in Computational Neuroscience*, KSEA West Gulf Coast Regional Conference, Houston, TX. 11/19/2016.

14. Invited Talk: *Understanding Neural Networks, from Without and from Within*, Transdisciplinary Research about Big Data Seminar Series. Korea Institute for Advance Studies, Seoul, Korea. 12/22/2016.

15. Invited Talk: *Questioning Questions in Computational Neuroscience*. Pasta and Profs (Texas A&m Undergraduate Honors Seminar). Texas A&M University. College Station, TX. 11/20/2016.

16. Invited Seminar: *Toward an Artificial Intelligence with Intrinsic Semantics*, Yonsei University, Seoul, Korea. 9/26/2016

17. Invited Seminar: *Questioning Questions in Computational Neuroscience* Kyungbuk National University, Daegu, Korea. 6/30/2016.

18. Invited Seminar: Title: Emergence of Tool Use in an Articulated Limb Controlled by Evolved Neural Circuits. Institution: Daegu-Gyeongbuk Institute of Science and Technology. Location: Daegu, Korea. Date: 6/30/2016.

19. Invited Seminar. Title: Autonomous Understanding of Internal Neural Network States Through Action. Institution: Samsung DMC R&D Center. Location: Seoul, Korea. Date: 6/28/2016.

20. Invited Seminar. Title: Questioning Questions in Computational Neuroscience. Institution: Society for Computational Neuroscience, Korea. Location: Seoul, Korea. Date: 12/21/2015.

21. Name: Invited Seminar. Title: Relationship Between Visual Cortical Response Powerlaw and Perceptual Threshold. Institution: Yonsei University. Location: Seoul, Korea. Date: 8/7/2014.

22. Invited Seminar. Title: Self-Organization of Tactile and Motor Maps in the Cortex. Institution: Samsung Advanced Institute of Technology. Location: Kiheung, Korea. Date: 8/1/2014.

23. Invited talk: *Autonomous Semantic Grounding Through Sensorimotor Learning*. Department of Computer Science, Yonsei University, Seoul, Korea. 7/4/2013.

24. Invited talk: *Mouse Connectomics: Exploring the Mouse Brainś Wiring Diagram*. Department of Brain and Cognitive Engineering, Korea University, Seoul, Korea. 7/3/2013.

25. Invited talk: *Learning About the Meaning of Deep Representations Through Action*. Samsung Advanced Institute of Technology, Kiheung, Korea. 6/28/2013.

26. Invited talk: *Agent Autonomy Through Action*. Daegu Gyeongbuk Institute of Science and Technology, Daegu, Korea. 6/20/2013.

27. Invited talk: *Neuroevolution and Other Techniques for Generating Realistic Behavior*. Texas Aggie Game Developers, Texas A&M University. 11/14/2012.

28. Invited talk: *Visual Cortical Response Power Law and Perceptual Thresholding*. Institute for Applied Mathematics and Computational Science, Texas A&M University. 10/3/2012.

29. Computer Engineering and Systems Seminar: *Relationship Between Visual Cortical Response Power Law and Perceptual Threshold*. Department of Electrical and Computer Engineering, Texas A&M University. 9/18/2012.

30. Invited talk: *Strange Relationship Between Perceptual Threshold and Power Law in Cortical Response Distribution*. Kyungbuk National University, Daegu, Korea. Daegu, Korea. 8/9/2012.

31. KAIST Bio and Brain Engineering Seminar: *Strange Relationship Between Perceptual Threshold and Power Law in Cortical Response Distribution*. Department of Bio and Brain Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea. 8/1/2012.

32. Invited talk: *Strange Relationship Between Perceptual Threshold and Power Law in Cortical Response Distribution*. Electronic and Telecommunications Research Institute (ETRI), Daejeon, Korea. 7/22/2012.

33. Invited talk: *Imaging and Mining Brain Circuitry at Submicrometer Resolution*. 2012 Korean-American Scientists and Engineers Association (KSEA) Central Texas Regional Conference, Austin, TX. 5/19/2012.

34. Invited seminar: *Temporal Dynamics at Multiple Levels of Brain Function*. Brain Corporation, San Diego, CA. Host: Dr. Eugene Izhikevich. 4/2/2012.

35. Cognoscenti (Cognitive Psychology Seminar): *Strange Relationship Between Perceptual Threshold and Power Law in Cortical Response Distribution*. Department of Psychology, Texas A&M University. 2/27/2012.

36. Motor Neuroscience Seminar: *Understanding the External World While Sitting Inside the Brain*. Department of Health and Kinesiology, Texas A&M University. 3/2/2012.

37. Cognoscenti (Cognitive Psychology Seminar): *Understanding the External World While Sitting Inside the Brain*. Department of Psychology, Texas A&M University. 12/5/2011.

38. Invited talk: *Emergence of Past and Future in Evolving Neural Networks*. UPE Seminar (Texas A&M University). 11/9/2011.

39. Invited talk: *Computational Modeling of the Thalamocortical Loop*. Korean American Biomedical Scientists Symposium. 11/5/2011.

40. Invited talk: *Evolution of Time in Neural Networks: Present to Past to Future.* Forum for AI. University of Texas at Austin. 9/15/2011.

41. Invited talk: *Global Sub-Micrometer-Level Survey of the Mouse Brain Neural Circuits Using the Knife-Edge Scanning Microscope*. UH Network Cluster Seminar. University of Houston. 3/4/2011.

42. Invited talk: *Global Sub-Micrometer-Level Survey of the Mouse Connectome Using the Knife-Edge Scanning Microscope*. Biocomplexity Institute, Indiana University. Host: Prof. John Beggs. 10/26/2010.

43. Invited talk: *Motor System's Role in Grounding, Development, and Recognition in Vision.* Tsinghua University. Host: Prof. Li Zhaoping. 7/9/2010.

44. Brain, Cognitive Science, and Education Seminar Series: *Motor System's Role in Grounding, Development, and Recognition in Vision*. Department of Education. Texas A&M University. 4/14/2010.

45. Invited talk: *Current Trends in Autonomous Intelligent Agent Technology*. Samsung Thales, Yongin, Korea. 4/1/2010.

46. Invited talk at the conference "The Human Connectome: Views from MRI and Microscope." *Global Sub-Micrometer-Level Survey of the Mouse Connectome Using the Knife-Edge Scanning Microscope*. 3/30/2010.

47. ECE Seminar Series: *Global Sub-Micrometer-Level Survey of the Mouse Connectome Using the Knife-Edge Scanning Microscope*. Department of Electrical and Computer Engineering, Texas A&M University. 3/9/2010.

48. Korean American Biomedical Scientists Symposium. *Complete submicrometer scans of mouse brain microstructure using the Knife-Edge Scanning Microscope.* University of Texas Medical School, Houston. 11/13/2009.

49. Invited Seminar.

    Imaging the Whole Mouse Brain at Submicromter Resolution Using the Knife-Egde Scanning Microscope. University of Texas Medical Branch. Galveston, TX. 11/6/2009.

50. Machine learning seminar. *Evolution of Recollection and Prediction in Neural Networks.* POSTECH, Pohang, Korea. Host: Prof. Seungjin Choi. 7/15/2009.

51. Computer Science Seminar. *Evolution of Recollection and Prediction in Neural Networks.* Yonsei University, Seoul, Korea. 7/7/2009.

52. Invited seminar. *Evolution of Recollection and Prediction in Neural Networks* Kyungbuk National University, Daegu, Korea. Host: Prof. Minho Lee. 7/29/2009.

53. Invited seminar. *Evolving Autonomous Agents and Scenarios to Support Interactive Training.* Agency for Defense Development, Seoul, Korea. 7/8/2009.

54. Invited seminar. *Evolving Autonomous Agents and Scenarios to Support Interactive Training.* Defense Acquisitions Program Administration, Seoul, Korea. 7/21/2009.

55. Invited seminar. *Evolution of Recollection and Prediction in Neural Networks Group addressed: Graduate students and faculty.* Seoul National University, Seoul, Korea. Host: Prof. Byung Tak Zhang. 7/8/2009.

56. Bio and Brain Science Seminar. *Evolution of Recollection and Prediction in Neural Networks.* KAIST, Daejeon, Korea. 7/22/2009.

57. Invited foreign expert seminar. *Nature of Texture: Visual or Tactile?* Electronics and Telecommunications Research Institute (ETRI), Daejeon, Korea. 7/14/2009.

58. Invited talk. *From Connectomics to Theories of Brain Function: An Internal, Dynamical Perspective.* Korea Institute of Advanced Studies (KIAS), Seoul, Korea. 7/31/2009.

59. Neurobiology and Anatomy Seminar Series (by invitaion, voted on by postdocs). *Dissecting, Imaging, and Modeling the Mouse Brain Network.* University of Texas Medical School, Houston. 3/5/2009.

60. Invited talk: *Dissecting, Imaging, and Modeling Brain Networks.* KOCSEA Technical Symposium 2008 (Vienna, VA). 10/26/08.

61. Forum for AI (invited talk): *Motor System's Role in Grounding, Development, and Recognition in Vision.* The University of Texas at Austin. 10/10/08. Host: Forum for AI.

62. Invited talk: *Dissecting, Imaging, and Modeling Brain Networks.* Undergraduate Science Research Club, Texas A&M University. 10/3/08.

63. Invited talk: *Dissecting, Imaging, and Modeling Brain Networks.* Department of Neurosurgery, Neuroscience Institute, Scott & White Clinic/Texas A&M Health Science Center, College of Medicine, Temple, TX. 8/21/08. Host: Prof. Robert Buchanan.

64. Invited talk: *Knife-Edge Scanning Microscopy: High-throughput Imaging and Analysis of Massive Volumes of Neuronal Microstructures and Networks.* The Neuroscience Institute, San Diego, CA. 8/19/08. Host: Prof. Jeff McKinstry.

65. Invited talk: *Delay compensation through facilitating synapses and STDP: A Neural Basis for Orientation Flash-Lag Effect.* Workshop on recent advances in activity-dependent plasticity, 5th Computational and Systems Neuroscience Meeting (COSYNE 2008). 2/4/2008. Organizer: Prof. Paul Munro (University of Pittsburgh).

66. Invited presentation: *Academic Life Outside Classrooms/Labs.* Student Interaction Session, Korean Computer Scientists and Engineers' Association (KOCSEA) Technical Symposium. 12/15/2007.

67. Invited talk: *Co-development of Visual Receptive Fields and Their Motor Primitive-based Decoding Scheme.* Behavioral and Cellular Neuroscience Research Seminar, Department of Psychology, Texas A&M University. Host: Prof. Paul Wells, 10/16/2007.

68. Invited talk: *Data Processing for Serial Sectioning Microscopy of Neural and Vascular Microstructure.* Multiscale Modeling Consortium, Working Group 3 on Macro to Micro Scale Imaging and Transport in Human Systems Host: Prof. Rob Kunz (Penn State University), 8/24/2007. (Online webinar)

69. Invited talk: *Action as a Foundation of Autonomous Visual Understanding.* Computer Vision Lab, University of Central Florida. Host: Prof. Mubarak Shah, 8/16/2007.

70. Invited talk: *Prediction, a Prerequisite to Goal-directed Behavior, and Its Possible Origin in Delay Compensation.* IT Symposium, US-Korea Conference, Reston, VA. 8/11/2007

71. Invited talk: *Motion-Based Autonomous Grounding: Inferring External World Properties Solely Based on Encoded Internal Neural States.* Department of Physics, Chungbuk National University, Korea, 6/7/2007.

72. Invited talk: *Prediction, a Prerequisite to Goal-directed Behavior and Its Possible Origin in Delay Compensation.* Department of Bio and Brain Engineering, Korea Advanced Institute of Science and Technology (KAIST), 6/7/2007.

73. Invited talk: *Motion-Based Autonomous Grounding: Inferring External World Properties Solely Based on Encoded Internal Neural States.* Department of Computer Science, Yonsei University, Korea, 6/5/2007.

74. Invited talk: *Detecting Salient Contours in Natural Images Using Orientaition-Filter Response Distribution; Multiscale Imaging, Analysis, and Integration of Brain Networks* Virtual Reality Research Team, Electronics and Telecommunications Research Institute (ETRI), Korea, 6/4/2007.

75. KAIST Computer Science Colloquium: *Action as a Foundation of Autonomous Visual Understanding.* Department of Computer Science, Korea Advanced Institute of Science and Technology (KAIST), 5/28/2007.

76. Invited talk: *Autonomous Semantics: Towards a Meaningful Information Technology.* KOCSEA Technical Symposium, Arizona State University, 12/15/06.

77. Invited talk at the Conference on Goal-Directed Neural Systems: *Prediction, a Prerequisite to Goal-directed Behavior, and Its Possible Origin in Delay Compensation.* University of Arlington, 11/3/06.

78. Faculty of Neuroscience Seminar: *What makes your thought march forward?: a role for the thalamus and the thalamic reticular nucleus.* Neuroscience Program, Texas A&M University (Host: Prof. Gregg B. Wells), 9/14/06.

79. Biomedical Engineering Department Seminar: *Binding Problem for Input vs. Output Representations and the Role of the Thalamus in Its Solution*. Department of Biomedical Engineering, Texas A&M University (Host: Prof. Wally Wu), 4/3/06.

80. Cognoscenti (Cognitive Psychology Seminar): *Relationship between Flash-Lag Effect and Delay Compensation in the Nervous System*. Department of Psychology, Texas A&M University (Host: Prof. Jyotsna Vaid), 2/19/06.

81. CPSC 681 Graduate Seminar: *Learning about the Outside World, Trapped within Your Brain*. Department of Computer Science, Texas A&M University (Host: Prof. Nancy Amato), 2/15/06.

82. Invited Talk: *Intrinsic, Autonomous Semantics in Natural and Artificial Agents*. Department of Biosystems, Korea Advanced Institute of Technology, Korea (Host: Prof. Soo-Young Lee), 11/25/2005.

83. Invited Talk: *Intrinsic, Autonomous Semantics in Natural and Artificial Agents*. Virtual Reality Research Laboratory, Electronics and Telecommunications Research Institute, Korea (Host: Dr. Wookho Son), 11/24/2005.

84. Invited Talk: *Intrinsic, Autonomous Semantics in Natural and Artificial Agents*. Artificial Brain Research Laboratory, School of Electrical Engineering and Computer Science, Kyungbuk National University, Korea (Host: Prof. Minho Lee), 11/24/2005.

85. Molecular and Cellular Networks Seminar: *Importance of Temporal Factors in Inferring Network Function from Its Structure: A Lesson from the Thalamocortical Circuit in the Brain*. Department of Computer Science, Texas A&M University. 10/20/2005.

86. Research Seminar: *Grounding Sensory Neural States on Action That Maintains Sensory Invariance*. At the Cognitive Neuroscience Center at the Université du Québec à Montréal (Host: Prof. Stevan Harnad), 8/3/05.

87. Research Seminar: *Inferring External Stimulus Properties from Internal Sensory State Alone Through Action and Invariance*. At the Visual Motor Research Lab, McGill University (Host: Prof. James J. Clark), 8/3/05.

88. Research Seminar: *Binding Problem for Input vs. Output Representations and the Role of the Thalamus in Its Solution*. At Prof. Terrence Sejnoswki's Lab (Computational Neurobiology Laboratory), at the Salk Institute. 6/14/05.

89. CPSC 681 Graduate Seminar: *Binding Problem of the Second Kind: Can the Brain Confuse Its Inputs from Its Outputs?* Department of Computer Science, Texas A&M University. 11/15/2004.

90. Summer Honors Invitational Program Lecture: *Autonomous Semantics in Natural and Artificial Agents.* A lecture for high-achieving high school students. 6/21/04.

91. CPSC 681 Graduate Seminar: *Autonomous Semantics in Natural and Artificial Agents.* Department of Computer Science, Texas A&M University. 10/22/2003.

92. Armadillo (Southwest Cognition Conference): *Learning the Semantics of Neural Representations Through Invariance-Driven Action.* Texas A&M University, College Station, TX. 10/17/2003.

93. Cognoscenti (Cognitive Psychology Seminar): *Learning the Meaning of Neural Spikes Through Sensory-Invariance Driven Action.* Department of Psychology, Texas A&M University. 9/8/2003.

94. Research Group Seminar @ OGI: *Processing of Analogy in the Thalamocortical Circuit*. At Prof. Melanie Mitchell's research group. Department of Computer Science, Oregon Graduate Institute. 7/25/2003.

95. Invited Talk: *Processing of Analogy in the Thalamocortical Loop: A Glue for Cortical Integration?*. Forum for Artificial Intelligence, Department of Computer Sciences, The University of Texas at Austin. 3/7/2003.

96. AI-Robotics Seminar: *An Analogical Framework for Understanding Brain and Intelligence*. Department of Computer Science, Texas A&M University. 10/11/2002.

97. Invited talk: *Second-Order Isomorphism: A Reinterpretation and Its Implications in Brain and Cognitive Sciences*. Department of Software Engineering, Sejong University, Seoul, Korea, 5/31/02.

98. Invited talk: *Neural Basis of Analogical Processing.* Department of Physics, Chungbuk National University, Chungju, Korea, 5/30/2002.

99. Invited talk: *Neural Basis of Analogical Processing.* Bioengineering Lab, School of Computer Science and Engineering, Seoul National University, Seoul, Korea, 5/29/2002.

100. Invited talk: Neural Basis of Analogical Processing. Department of Computer Science, Yonsei University, Seoul, Korea, 6/3/2002.

101. Cognoscenti (Cognitive Psychology Seminar): *Second-Order Isomorphism: A Reinterpretation and Its Implications in Brain and Cognitive Sciences*. Department of Psychology, Texas A&M University. 3/18/2002.

102. CPSC 681 Graduate Seminar: *Visual Perceptual Grouping in a Self-Organizing Map of Spiking Neurons*. Department of Computer Science, Texas A&M University. 10/1/2001.

103. AI-Robotics Seminar: *Perceptual Grouping in a Self-Organizing Map of Spiking Neurons.* Department of Computer Science, Texas A&M University. 9/14/2001.

104. Invited Talk: *Visual Contour Integration in a Self-Organizing Map of Spiking Neurons*. Department of Computer Science, Texas A&M University. (Host: Prof. Don Friesen) 4/24/2001.

105. Invited Talk: *Visual Contour Integration in a Self-Organizing Map of Spiking Neurons*. Department of Computer Science, Florida State University. (Host: Prof. Xiuwen Liu) 4/18/2001.

106. Invited Talk: *Visual Contour Integration in a Self-Organizing Map of Spiking Neurons*. Department of Computer Science, Ohio State University. (Host: Prof. DeLiang Wang) 4/10/2001.

107. Invited Talk: *Visual Contour Integration in a Self-Organizing Map of Spiking Neurons*. Department of Computer Science, Rochester Institute of Technology. 4/3/2001.

108. Technology Seminar: *Security on the Internet*. Korean-American Scientists and Engineers Association Austin Chapter, Held at Samsung Austin Semiconductor. 4/8/2000.

109. Invited Talk: *A Self-Organizing Neural Network for Contour Integration through Synchronized Firing*, Fifth Annual University of Texas at Austin Symposium on Neuroscience, Austin, TX, 2/3/2000.

8.2 Posters and Demos

1. KOCSEA Technical Symposium 2009, 12/18/08, Las Vegas, NV. Choongseog Park, Yoon H. Bai, Heeyoul Choi, and Yoonsuck Choe. *Nature of Texture: Visual or Tactile?*

2. KOCSEA Technical Symposium 2008, 10/25/08, Vienna, VA. Jaerock Kwon and Yoonsuck Choe, *Internal State Predictability as an Evolutionary Precursor of Self-Awareness and Agency*.

3. WAM-BAMM (World Association of Modelers–Biologically Accurate Modeling Meeting, 3/24/2006, San Antonio, TX. Bruce H. McCormick, Louise C. Abbott, Yoonsuck Choe, John Keyser, Jaerock Kwon, and David Mayerich, *Full-scale Submicron Neuroanatomy to Constrain Computational Models of Biologically Accurate Neuron and Networks.*

4. 1st Annual Computational Cognitive Neuroscience Conference, 11/10/2005, Washington, DC. Bruce H. McCormick, Louise C. Abbott, Yoonsuck Choe, John Keyser, and David Mayerich, *Full-scale Submicron Neuroanatomy to Constrain Computational Models of the Brain.*

5. WAM-BAMM (World Association of Modelers–Biologically Accurate Modeling Meeting, 4/1/2005, San Antonio, TX. Choe, Y. and Yu, Y., *Role of the thalamic reticular nucleus in selective propagation of the results of cortical computation.*

6. WAM-BAMM (World Association of Modelers–Biologically Accurate Modeling Meeting, 4/1/2005, San Antonio, TX. Lim, H. and Choe, Y., "Facilitatory neural dynamics for extrapolation and delay."

7. The Society for Neuroscience Exhibit Program, National Institute of Mental Health Human Brain Project Booth, 11/16/2005, Washington, DC. Bednar, J. A., and Choe, Y., De Paula, J., Miikkulainen, M., and Provost, J. (2002). *Modeling Visual Cortex Using the* Topographica *Cortical Map Simulator.*

8. Cortical Function: A View from the Thalamaus (Symposium): *Role of the Thalamic Reticular Nucleus in Selective Propagation of the Results of Cortical Computation*. University of Wisconsin. 9/12/04.

9. Human Brain Project Conference: *Modeling Cortical Function and Development with Topographica*. National Institute of Mental Health, Bethesda, MD. 5/12/2003.

10. Society for Neuroscience Exhibit Program: *Modeling Topographic Maps*. National Institute of Mental Health Human Brain Project Booth, Orlando, FL. 11/4/2002.

11. Society for Neuroscience Exhibit Program: *The Topographica Cortical Map Simulator*. National Institute of Mental Health Human Brain Project Booth, Orlando, FL. 11/4/2002.

12. Dynamical Neuroscience (Society for Neuroscience Satellite Symposium): *Processing of Analogy in the Thalamo-Cortical Loop: A Hypothesis*. Orlando, FL. 11/1/2002.

13. Armadillo (Southwest Cognition Conference): *Neural Basis of Simple Analogy Making*. Trinity University, San Antonio, TX. 10/26/2002.

14. Sensory Coding and the Natural Environment (Gordon Conference): *Contour Integration in a Self-Organizing Map of Spiking Neurons*. Mt. Holyoak College, CT. 7/3/2002.

9 Teaching

9.1 Texas A&M University: Instructor

Department of Computer Science

- **Spring 2020**: CSCE 625, Introduction to Artificial Intelligence (graduate lecture).
  CSCE 420, Introduction to Artificial Intelligence (undergraduate lecture).

- **Spring 2017**: CSCE 636, Neural Networks (graduate lecture).
  CSCE 633, Machine Learning (graduate lecture).

- **Fall 2015**: CSCE 315, Programming Studio (undergraduate lecture + lab).

- **Spring 2015**: CSCE 636, Neural Networks (graduate lecture).
  CSCE 633, Machine Learning (graduate lecture).

- **Fall 2014**: CSCE 315, Programming Studio (undergraduate lecture + lab).

- **Summer 2014**: CSCE 315, Programming Studio (undergraduate lecture + lab).

- **Spring 2014**: CSCE 633, Machine Learning (graduate lecture).

- **Fall 2013**: CSCE 625, Introduction to Artificial Intelligence (graduate lecture).
  CSCE 315, Programming Studio (undergraduate lecture + lab).

- **Spring 2013**: CSCE 633, Machine Learning (graduate lecture).

- **Fall 2012**: CSCE 315, Programming Studio (undergraduate lecture + lab).
  CSCE 644, Cortical Networks (graduate lecture).

- **Summer 2012**: CSCE 315, Programming Studio (undergraduate lecture + lab).

- **Spring 2012**: CSCE 181, Introduction to Computing (undergraduate seminar).

- **Spring 2012**: CSCE 636, Neural Networks (graduate lecture).

- **Fall 2011**: CSCE 315, Programming Studio (undergraduate lecture + lab).

- **Spring 2011**: CSCE 633, Machine Learning (graduate lecture).

- **Fall 2010**: CSCE 315, Programming Studio (undergraduate lecture + lab).
  CPSC 625: Introduction to Artificial Intelligence (graduate lecture).
- **Spring 2010**: CSCE 644, Cortial Networks (graduate lecture).
- **Spring 2009**: CPSC 633, Machine Learning (graduate lecture).
- **Fall 2008**: CPSC 420, Introduction to Artificial Intelligence (undergraduate lecture).
- **Spring 2008**: CPSC 636, Neural Networks (graduate lecture).
- **Fall 2007**: CPSC 420, Introduction to Artificial Intelligence (undergraduate lecture).
  CPSC 625: Introduction to Artificial Intelligence (graduate lecture).
- **Spring 2007**: CPSC 633, Machine Learning (graduate lecture).
  CPSC 644, Cortical Networks (graduate lecture).

- **Fall 2006**: CPSC 420, Introduction to Artificial Intelligence (undergraduate lecture).
- **Spring 2006**: CPSC 633, Machine Learning (graduate lecture);
  CPSC 420, Introduction to Artificial Intelligence (undergraduate lecture).
- **Fall 2005**: CPSC 625: Introduction to Artificial Intelligence (graduate lecture).
- **Spring 2005**: CPSC 420 (honors), Introduction to Artificial Intelligence (undergraduate lecture).
  CPSC 689, Special Topics in Computation in Neural and Biological Systems (graduate seminar).
- **Fall 2004**: CPSC 625: Introduction to Artificial Intelligence (graduate lecture).
- **Spring 2004**: CPSC 420 (honors), Introduction to Artificial Intelligence (undergraduate lecture).
  CPSC 689, Special Topics in Intelligent Neural Systems (graduate seminar).
- **Fall 2003**: CPSC 420, Introduction to Artificial Intelligence (undergraduate lecture).
- **Spring 2003**: CPSC 689, Special Topics in Intelligent Neural Systems (graduate seminar).
- **Fall 2002**: CPSC 420, Introduction to Artificial Intelligence (undergraduate lecture).
  CPSC 625: Introduction to Artificial Intelligence (graduate lecture).
- **Spring 2002**: CPSC 320 (honors), Introduction to Artificial Intelligence (undergraduate lecture).

9.2 The University of Texas at Austin: Teaching Assistant

Department of Computer Sciences

- **Spring 2001**: CS345, Programming Languages (undergraduate lecture);
  Instructor: Prof. Greg Lavender.
- **Spring 1997, Spring/Fall 1998**: CS378, Network Protocol Implementation;
  Instructor: Prof. Chris Edmonsdon-Yurkanan.
- **Fall 1996**: CS310, Computer Organization and Programming;
  Instructor: Prof. Chris Edmonsdon-Yurkanan.
  - Taught discussion sections twice a week.
  - Developed I/O library for Motorola 68000 and wrote user's manual with the instructor.

10 Student Advising

10.1 Ph.D.

1. Qinbo Li (Texas A&M CS): in progress (Fall 2018–).
2. Qing Wan (Texas A&M CS): in progress (Fall 2016–).
3. Han Wang (Texas A&M CS): graduated (Fall 2013–Spring 2020).
4. Khuong Nguyen (Texas A&M CS): graduated (Fall 2013–Fall 2019).
5. Michael Nowak (Texas A&M CS): graduated (Fall 2013–Fall 2019).
6. Junseok Lee (Texas A&M CS): graduated (Fall 2013–Summer 2018).
7. Jaewook Yoo (Texas A&M CS): graduated (Fall 2012–Summer 2018).
8. Chul Sung (Texas A&M CS): graduated (Spring 2010–Summer 2014). Staff Software Engineer, IBM Research, Austin, TX.
9. Timothy Mann (Texas A&M CS): graduated (Fall 2007–Fall 2012). Postdoc, Technion, Israel.
10. Ji Ryang Chung (Texas A&M CS): graduated (Fall 2005–Fall 2011). Senior Engineer, Samsung Mobile, Korea.
11. Heeyoul "Henry" Choi (Texas A&M CS): graduated (Spring 2007–Fall 2011). Research Staff Member, Samsung Advanced Institute of Technology, Korea.
12. Huei-Fang Yang (Texas A&M CS): graduated (Spring 2006–Summer 2011). Postdoc, INRIA, Sophia Antipolis, France.
13. Dong Hyeop Han (Texas A&M CS): graduated (Spring 2007–Summer 2009). Senior Engineer, Samsung Electronics.
14. Jaerock Kwon (Texas A&M CE): graduated (Fall 2005–Summer 2009). Assistant Professor, Kettering University, Flint, MI.
15. Choon Seog Park (Texas A&M CE): graduated (Fall 2005–Summer 2009). Lieutenant Colonel, Republic of Korea Army.
16. Hao Xiong (Texas A&M CS): graduated (Spring 2006–Summer 2008).
17. Yingwei Yu (Texas A&M CS): graduated (Summer 2003–Summer 2006). Principal Research Scientist, IHS Inc., Houston, TX. Researcher, University of California, Berkeley.
18. Heejin Lim (Texas A&M CS): graduated (Spring 2004–Summer 2006). Adjunct Professor, Prairie View A&M University.

10.2 M.S. and M.C.S.

1. Sungjun Lim (Texas A&M CS): in progress (Spring 2014–).
2. Wookyung An (Texas A&M CS): in progress (Spring 2014–).
3. Qinbo Li (Texas A&M CS): in progress (Spring 2014–).
4. Manisha Srivastava (Texas A&M CS): in progress (Spring 2014–).
5. Ankur Singhal (Texas A&M CS): in progress (Fall 2013–).
6. Ananth Dileepkumar (Texas A&M CS): in progress (Fall 2013–).
7. Wencong Zhang (Texas A&M CS): in progress (Spring 2013–).

8. Wenjie Yang (Texas A&M CS): in progress (Spring 2013–).
9. Shashwat Lal Das (Texas A&M CS): in progress (Spring 2013–).
10. Raj S. Shah (Texas A&M CS): in progress (Fall 2012–).
11. Jinho Choi (Texas A&M CS): graduated (Fall 2011–Summer 2013). Captain, Republic of Korea Army.
12. Dongkun Kim (Texas A&M CS): graduated (Fall 2009 – Summer 2011). Captain, Republic of Korea Army.
13. Yoon Bai (Texas A&M CE): graduated (Spring 2007–Summer 2008). Currently applying to graduate programs (accepted to University of Texas at Austin).
14. Daniel C.-Y. Eng (Texas A&M CE): graduated (Spring 2007–Fall 2008). Software Developer, RadioShack.
15. Beomsoon Jang (Texas A&M CS): graduated (Spring 2006–Summer 2007). Major, Republic of Korea Army.
16. Jyothi Swaroop Guntupalli (Texas A&M CS): graduated (Spring 2006–Fall 2007). Ph.D. student at Dartmouth University
17. Hari Shankar Muddana (Texas A&M CS): graduated (Spring 2005–Summer 2006; coadvisor: Bruce H. McCormick). Postdoc, University of California, San Diego.
18. Navendu Misra (Texas A&M CS): graduated (Summer 2004–Summer 2005). Software Engineer, Paypal.
19. Sejong Oh (Texas A&M CS): graduated (Summer 2003–Summer 2004). Major, Republic of Korea Airforce.
20. S. Kumar Bhamidipati (Texas A&M CS): graduated (Fall 2002–Spring 2004). Senior Development Engineer 2 at Microsoft.
21. Subramonia P. Sarma (Texas A&M CS): graduated (Spring 2002–Fall 2003). Program Manager, Microsoft (Windows Azure).

10.3 Undergraduate

1. Ovidio De Jesus Henriquez Jr. (Texas A&M CSE): Spring 2014.
2. Eleni Mijalis (Texas A&M Biology [CS minor]): Fall 2013, Spring 2014.
3. Rachel Rorn (Texas A&M Psychology): Summer 2013, Spring 2014.
4. Mitchell Priour (Texas A&M Psychology): Summer 2013, Fall 2013. Spring 2014. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU: 2013 Summer).
5. Jeff Harrison (Texas A&M CSE): Fall 2013.
6. Jinsoo Kim (Texas A&M CSE): Summer 2013. Supported by Texas A&M College of Engineering Undergraduate Summer Research Grant (USRG) Program.
7. Jonathan Garcia (Texas A&M Biomed): Summer 2011. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU).
8. Christopher Sinks (U of Missouri Biomed): Summer 2011. Supported by Texas A&M College of Engineering Undergraduate Summer Research Grant (USRG) Program.
9. Janelle Fawver (Texas A&M Biomed): Summer 2010. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU).

10. Aaron Panchal (Westmont U CS): Summer 2010. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU).
11. Kasra Manavi (U of NM CS): Summer 2008. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU).
12. Gen Kazama (McGill CS): Summer 2008. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU).
13. Steven Snyder (Texas A&M CS): Spring 2007. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU).
14. Daniel Chern-Yeow Eng (Texas A&M CS): Fall 2006.
15. Erica Bolan (Carleton U CS): Summer 2006. Supported by the Computing Research Association–Women's Distributed Mentor Project (CRA-W DMP).
16. Timothy Mann (SUNY at Potsdam CS): Summer 2006. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU).
17. Stuart Heinrich (U of Vermont CS): Summer 2005. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU).
18. Andrew Jones (Texas A&M CE): Summer 2005. Supported by Texas A&M College of Engineering Undergraduate Summer Research Grant (USRG) Program. Received the "Best Poster Award."
19. Maritza Johnson (U of San Diego CS): Summer 2004. Supported by the Computing Research Association–Women's Distributed Mentor Project (CRA-W DMP). Co-advised with Prof. Ricardo Gutierrez-Osuna.
20. J. Perry Evans (Rose-Hulman CS): Summer 2004. Supported by the National Science Foundation Research Experience for Undergraduates program (NSF REU).
21. Josh Elkin (Texas A&M CS): Spring 2004.
22. Jeffrey Cheak (Texas A&M CS): Summer 2003.
23. Gabriel Marquez (The University of Texas, El Paso): Summer 2003. Supported by Texas A&M College of Engineering Undergraduate Summer Research Grant (USRG) Program.
24. Brad Bussee (Texas A&M CS): Summer 2003.

10.4 Postdoctorate

1. Hyeon-Cheol Lee: 2/2002–2/2003. Korea Aerospace Research Institute.

11 Service

11.1 External

1. **Editorial board:**
   (a) Neural Networks (2012–2014).
   (b) Springer Encyclopedia on Computational Neuroscience (2011–2013, topic editor).
   (c) Neural Information Processing – Letters and Reviews (2002–).
2. **Societal committees and leadership:**
   (a) IEEE International Joint Conference on Neural Networks (IJCNN 2015): Program chair.

(b) Korean Computer Scientists and Engineers Association in America (KOCSEA: communications officer, 2006–2007; secretary, 2008; vice president, 2009; president, 2010)

(c) IEEE CIS Vision and Speech Processing Technical Committee (2007–).

(d) Special Interest Group Committee (SIGCOM) within the International Neural Networks Society (INNS, 2006–).

3. **Working Group:**

(a) NIH/NSF/DOE/NASA Multiscale Modeling Consortium, Multiscale Imaging Working Group (working group lead, 2005–2010).

4. **Program committees and panels:**

(a) International Joint Conference on Artificial Intelligence/European Conference on Artificial Intelligence (IJCAI/ECAI 2018, program committee)

(b) International Conference on Intelligent Computing (ICIC 2014, program committee).

(c) International Joint Conference on Neural Networks (IJCNN 2013, 2009, 2008).

(d) Association for the Advancement of Artificial Intelligence (AAAI 2013, 2012, program committee; 2007, reviewer).

(e) IEEE Consumer Communications and Networking Conference (2013, technical program committee).

(f) International Conference on Pattern Recognition (ICPR 2012, 2014: technical committee).

(g) Brain Mind Institute International Conference on Brain Mind (ICBM 2012, program committee).

(h) Workshop on Self-Organizing Maps (WSOM 2012, 2011, 2010, 2009, 2005, 2003, program committee).

(i) International Joint Conference on Neural Networks (IJCNN 2011, award chair)

(j) International Conference on Development and Learning (ICDL 2009, area chair).

(k) IEEE Symposium on Computational Intelligence for Multimedia Signal and Vision Processing (2009).

(l) SIAM Conference on Life Sciences, Minisymposium on Multiscale Imaging and Image Analysis (session chair, 2008).

(m) KOCSEA Technical Symposium (co-chair, 2008; sponsorship chair, 2007; publication chair, 2006).

(n) IEEE International Conferences on Cybernetics and Intelligent Systems (CIS 2008).

(o) Special session on Bio-inspired Computational Vision, World Congress on Computational Intelligence 2008, technical committee).

(p) IEEE Cybernetics and Intelligent Systems (CIS 2006, 2004).

(q) International Symposium on Artificial Brain with Emotion and Learning (ISABEL 2006).

(r) Post-IJCNN Workshop on Bio-Inspired Models and Hardware (BIMH 2005).

(s) Post-IJCNN Workshop on Neurodynamics and Intentional Dynamic Systems (IDS 2005, panelist).

(t) International Conference on Machine Learning (ICML 2004).

5. **Workshops and symposia organized:**

(a) CNS*2010 Workshop on High-throughput 3D microscopy and high-performance computing for multi-scale modeling and simulation of large-scale neuronal circuits (Co-Chair, 2010).

(b) Society for Neuroscience Minisymposium on High-Throughput Microscopy and Computational/Theoretical Challenges in the Analysis of Neural Circuit Structure (Co-Chair, 2008).

6. **Grant reviews:**

(a) NSF review panel (2013).

(b) NIH National Institute of General Medical Sciences (NIGMS) grant review panel (2013).

(c) NIH National Institute of Biological and Biomedical Imaging (NIBIB) grant review panel (2013).

(d) NIH National Institute of Biological and Biomedical Imaging (NIBIB) grant review panel (2012 [twice]).

(e) NSF proposal review (ad hoc reviewer, 2011).

(f) NIH BRAIN program review panel (2010).

(g) DOE Computational Biology and Bioinformatic review panel (2010).

(h) ANR (Agence Nationale De La Recherche [French National Research Agency]) Programme Syscom review (ad hoc reviewer, 2009).

(i) NIH Grand Opportunities review panel (2009).

(j) AAAS (American Association for the Advancement of Science) review panel for King Abdulaziz City for Science and Technology grants (2009).

(k) NSF proposal review panel 2 (2008).

(l) NSF proposal review panel 1 (2008).

7. **Award reviews:**

   (a) Samsung Humantech Thesis Prize (2012, 2013, reviewer).

8. **Journal reviews:**

   (a) IEEE Transactions on Neural Networks,

   (b) IEEE Transactions on Image Processing,

   (c) IEEE Transactions on System, Man and Cybernetics: Systems,

   (d) Neurocomputing,

   (e) Neural Networks,

   (f) Proceedings of the Royal Society A: Mathematical, Physical, and Engineering Sciences,

   (g) Behavioral and Brain Sciences,

   (h) Biological Cybernetics,

   (i) Journal of Computational Neuroscience,

   (j) Neural Information Processing–Letters and Reviews,

   (k) International Journal of Humanoid Robotics,

   (l) Journal of Visual Communications and Image Representation,

   (m) Connection Science.

11.2 Intramural (Texas A&M University)

1. Department of Computer Science and Engineering:

   (a) department head search committee (elected memeber, 2013–2014)

   (b) advisory committee (elected member, 2012–2013).

   (c) computer services committee (member, 2013–2014)

   (d) communications committee (chair, 2012–2013, 2013–2014),

   (e) climate committee (2012–2013).

   (f) undergraduate student awards committee (chair, 2011–2012; member 2012–2013).

   (g) space committee (2009–2010, 2010–2011).

   (h) graduate admissions committee (2009–2010, 2010–2011, 2011–2012).

   (i) colloquium coordinator (2007–2008, 2008–2009; with Andruid Kearne).

(j) robotics faculty search committee (2008–2009).
(k) graduate admissions committee (2008–2009).
(l) undergraduate student awards committee (2006–2007, 2007–2008).
(m) REU program workgroup (2005–2006).
(n) gradate advisory committee (2004–2005).
(o) undergraduate curriculum committee (2003–2004).
(p) graduate advisory committee (2002–2003).
(q) graduate admissions and awards committee (2002–2003).
(r) bioinformatics faculty search committee (Spring 2002).
(s) web committee (Spring 2002, Summer 2002, Fall 2002).
(t) library committee (2001–2002, 2002–2003).

2. Texas A&M Institute for Neuroscience:
   (a) undergraduate curriculum committee (elected member, 2011–2013): contributed to the establishment of the undergraduate neuroscience certificate program (approved).
   (b) Texas A&M Institute for Neuroscience landmark proposal committee (2009): contributed as one of the submitters.
3. College of Engineering:
   (a) honors and award committee (2011–2013)
   (b) Health Engineering and Research Institute (HERI) implementation committee (2012).

12 Professional Societies

1. Association for the Advancement of Artificial Intelligence (AAAI): 2000–
2. International Neural Networks Society (INNS): 2001–, Senior member since 2009
3. American Association for the Advancement of Science (AAAS): 2001–
4. Cognitive Science Society: 2002, 2004
5. Society for Neuroscience: 2004–
6. IEEE: 2006–, Senior member since 2014
7. Korean Computer Scientists and Engineers Association in America: 2006–
8. Korean Scientists and Engineers Association: 2006–
9. Association of Korean Neuroscientists: 2008–

13 References

Available upon request.