Daniel A. Afergan

afergan@gmail.com http://www.cs.tufts.edu/~afergan

Professional and Research Experience

Google Inc. Cambridge, MA
Software Engineering Intern *May 2014 - Aug. 2014*

- Designed and implemented new user interface transitions for Google Image Search visual refinements
- Conducted a live traffic study on Image Search visual refinement transitions and a user experience study on mobile Image Search
- Developed a custom analysis and MapReduce for Image Search user sessions
- Created a core JavaScript layout service for Google Web Server

Tufts University Human-Computer Interaction Lab Medford, MA
Research Assistant & Teaching Assistant *Jan. 2011 - Present*

- Developed adaptive brain-computer interfaces (BCI) using functional near-infrared spectroscopy (fNIRS) as a passive input to improve performance
- Built framework and optimized machine learning models to improve accuracy of real-time predictions of cognitive state
- Created Google Glass framework to adapt level of user notifications based on physiological state and accompanying 3D environment simulation testbed
- Teaching Assistant for Visual Basic for Business Applications, Spring 2011 and Object-Oriented Programming for Graphical User Interfaces, Fall 2011. Participated in the creation and organization of Adaptive User Interfaces and Passive Brain-Computer Interface seminar courses

United States Naval Research Laboratory Washington, DC
Advisory Cognitive Scientist, Strategic Analysis Inc. *June 2005 - Dec. 2010*

- Provided scientific and technical analysis of virtual environments for automated training at the Warfighter Human System Integration Laboratory
- Researched, planned, and conducted experiments to test benefits of immersive locomotive virtual environment, augmented reality, and neurophysiological studies for US Marine Corps infantry training
- Created software to perform automated real-time mitigations of virtual environments according to physiological measurements
- Developed simulation software to test teamwork and military operational skills and correlate them with neural signals (via EEG)

Education

Tufts University Medford, MA
Doctoral Candidate in Computer Science *Jan. 2011 - May 2015 (expected)*

The George Washington University Washington, DC
Master of Science in Computer Science *May 2009*

University of Pennsylvania Philadelphia, PA
Bachelor of Arts in Cognitive Science, concentration in Computation and Cognition *May 2005*
Minors in Psychology and Computer Science and Engineering

Additional Information

United States Department of Defense - Secret Clearance
Programming: Java, JavaScript, C++, C#, Processing, MATLAB, LaTeX, HTML, Go
Boston Maccabi Rugby Football Club Social Chair, 2012-2013
Tufts University Graduate Student Council Academic and Career Development Chair, 2013-2014, Computer Science department representative
New England Chapter Human Factors and Ergonomics Society Secretary, 2014-present

Conference Proceedings

[1] Afergan, D., Peck, E.M., Solovey, E.T., Jenkins, A.J., Hincks, S.W., Brown, E.T., Chang, R., and Jacob, R.J.K. Dynamic Difficulty Using Brain Metrics of Workload. *Proceedings of ACM Conference on Human Factors in Computing Systems (CHI) 2014*, ACM Press, 2014. **Best Paper Award Honorable Mention (top 5%)**.

[2] Afergan, D., Shibata, T., Peck, E.M., Hincks, S.W., Yuksel, B.F., Chang, R., and Jacob, R.J.K. Brain-Based Target Expansion. *Proceedings of ACM Symposium on User Interface Software and Technology (UIST) 2014*, ACM Press, 2014.

[3] Bailey, S.P., Pfluger, K.C., Holt, C., La Budde, Z., Afergan, D., Bartlett, S., Stripling, R., Miller, P.C., and Hall, E.E. Changes in Performance of a Virtual Reality Task Subsequent to Prolonged Exercise in the Heat and Carbohydrate Supplementation. *Proceedings of American College of Sports Medicine National Meeting*, 2006. Abstract published in *Medicine and Science in Sports and Exercise*, 38 (5 Supp.), S269-270.

[4] Peck, E.M., Afergan, D., and Jacob, R.J.K. Investigation of fNIRS Brain Sensing as Input to Information Filtering Systems. *Proceedings of Augmented Human 2013*, 2013.

[5] Sibert, L.E., Templeman, J.N., Stripling, R., Page, R.C., Coyne, J.T., La Budde, Z., and Afergan, D. Comparison of Three Virtual Environment Locomotion Interaction Techniques In Terms of Path Integration Performance. *Proceedings of Human Factors and Ergonomics Society Annual Meeting 2008*, 2008.

[6] Stripling, R., Templeman, J.N., Sibert, L.E., Afergan, D., Cole, A., Cohn, J.V., Coyne, J.T., and La Budde, Z. Creating Effective First Person Training Tools: Evaluating Locomotion Interfaces. *Proc. American Psychological Association Conference 2005*, 2005.

Book Chapters

[7] Afergan, D. and Davis, J.L. Promising Directions for Improved Training, Learning, and Memory. *Foundations of Augmented Cognition, 4th Ed.* Schmorrow, D.D., Nicholson, D.M., Drexler, J.M., and Reeves, L.M. (Eds.) California: Falcon (2007), pp. 198-204. Presented at *Augmented Cognition International 2007*, 2007.

[8] Peck, E.M., Afergan, D., Yuksel, B.F., Lalooses, F., Jacob, R.J.K. Using fNIRS to Measure Mental Workload in the Real World. *Advances in Physiological Computing*. Springer 2013.

[9] Stripling, R., Coyne, J.T., Cole, A., Afergan, D., Barnes, R.L., Rossi, K., Reeves, L., and Schmorrow, D.D. Automated SAF Adaptation Tool (ASAT). *Foundations of Augmented Cognition, 3rd Ed.* Schmorrow, D.D., and Reeves, L.M. (Eds.) Heidelberg, Germany: Springer-Verlag, pp. 346-353, 2011. Presented at *Proceedings of the Third International Conference on Foundations of Augmented Cognition*, 2007.

[10] Tognoli, E., Kovacs, A., Suutari, B., Afergan, D., Coyne, J.T., Gibson, G., Stripling, R., and Kelso, J.A.S. Behavioral and Brain Dynamics of Team Coordination Part I: Task Design. *Foundations of Augmented Cognition. Directing the Future of Adaptive Systems.* Schmorrow, D.D. and Fidopiastis, C. (Eds.) Heidelberg, Germany: Springer-Verlag, pp. 257-264, 2011. Invited paper at *Human-Computer Interaction International 2011.*

[11] Tognoli, E., Kovacs, A., Suutari, B., Afergan, D., Coyne, J.T., Gibson, G., Stripling, R., and Kelso, J.A.S. Behavioral and Brain Dynamics of Team Coordination Part II: Neurobehavioral Performance. *Foundations of Augmented Cognition. Directing the Future of Adaptive Systems.* Schmorrow, D.D. and Fidopiastis, C. (Eds.) Heidelberg, Germany: Springer-Verlag, pp. 376-382, 2011. Invited paper at *Human-Computer Interaction International 2011.*

Journal Articles

[12] Bailey, S.P., Holt, C., Pfluger, K.C., La Budde, Z., Afergan, D., Stripling, R., Miller, P.C., and Hall, E.E. Impact of Prolonged Exercise in the Heat and Carbohydrate Supplementation on Performance of a Virtual Environment Task. *Military Medicine*, 173(2), pp. 187-192, 2008.

[13] Solovey, E.T., Afergan, D., Peck, E.M., Hincks, S.W., Jacob, R.J.K. Designing Implicit Interfaces for Physiological Computing: Guidelines and Lessons Learned using fNIRS. *ACM Transactions on Computer-Human Interaction (TOCHI)*, In Press, 2014.

Poster Presentations

[14] Belyusar, D., Reimer, B., Mehler, B., Afergan, D., Coughlin, J.F., and Solovey, E.T. Utilizing functional near-infrared spectroscopy to identify cognitive processes contributing to workload in a dual-task environment. *Society for Neuroscience Annual Meeting*, 2014.

[15] Kovacs, A.J., Tognoli, E., Afergan, D., Coyne, J., Gibson, G., Stripling, R., and Kelso, J.A.S. Behavioral and brain dynamics of team coordination. *Society for Neuroscience Annual Meeting*, 2011.

[16] Kovacs, A.J., Tognoli, E., Afergan, D., Coyne, J., Gibson, G., Stripling, R., and Kelso, J.A.S. Brain dynamics of coordinated teams. *Society for Neuroscience Annual Meeting*, 2010.

[17] Shibata, T., Peck, E.M., Afergan, D., Hincks, S.W., Yuksel, B.F., and Jacob, R.J.K. Building Implicit Interfaces for Wearable Computers with Physiological Inputs: Zero Shutter Camera and Phylter. *Adjunct proceedings of ACM Symposium on User Interface Software and Technology (UIST) 2014*, ACM Press, 2014.

[18] Yuksel, B.F., Peck, E.M., Afergan, D., Hincks, S.W., Shibata, T., Kainerstorfer, J., Tgavalekos, K., Sassaroli, A., Fantini, S., Jacob, R.J.K. Functional near?-infrared spectroscopy for adaptive human?computer interfaces. *SPIE Photonics West*, Accepted for publication, 2015.

Other Papers

[19] Afergan, D. Using Brain-Computer Interfaces for Implicit Input. *Adjunct proceedings of ACM Symposium on User Interface Software and Technology (UIST) 2014*, Doctoral Symposium, ACM Press, 2014.

[20] Afergan, D. Speed-Accuracy Comparison of Navigational Interfaces. Master's Thesis, The George Washington University, 2009.

[21] Afergan, D., Peck, E.M., Chang, R., and Jacob, R.J.K. Using Passive Input to Adapt Visualization Systems to the Individual. *ACM CHI 2013 Workshop, Many People, Many Eyes: Aggregating Influences of Visual Perception on User Interface Design*, 2013.

[22] Coyne, J.T., Stripling, R., Pfluger, K.C., LaBudde, Z., and Afergan, D. Company and Below Command and Control Information Exchange Study. *U.S. Naval Research Laboratory*, N0001406WX20812, 2007.

[23] Stripling, R., Templeman J.N., Sibert, L.E., Coyne, J.T., Page, R.G., La Budde, Z., and Afergan, D. Identifying Interface Limitations for Virtual Environment Training Systems. *Department of Defense Human Factors Engineering Technical Group Meeting 2006*, 2006.

Distinctions

Invited Talks

[1] Tufts University Colloquium: Research Talk, *Pointing Performance of the Xbox 360 Controller, Wii Remote, And Mouse*, Apr. 5, 2012

[2] MIT Humans and Automation Lab Colloquium, *Dynamic UAV Interface Using Brain Measures to Modulate Workload*, Oct. 10, 2012

[3] New England Chapter Human Factors and Ergonomics Society 2013 Student Research Conference, *Dynamic Difficulty Using Brain Metrics of Workload for UAV Operators*, Apr. 12, 2013

[4] Guest lecture, CS220: Human-Computer Interaction. Wellesley College, Apr. 17, 2014

[5] New England Chapter Human Factors and Ergonomics Society 2014 Student Research Conference, *GlassRoutes: Using Passive Brain Input for Adaptive Glass Information Delivery*, Apr. 18, 2014

[6] MIT Lincoln Laboratory, *Adaptive Strategies for Implicit Interfaces using Physiological Computing*, Apr. 22, 2014

Press

[1] *Discovery News* (Feb. 28, 2013). "Brain Scanner Customizes Web Surfing for You," http://news.discovery.com/tech/gear-and-gadgets/brain-scanner-filters-unwanted-websites-130301.htm

[2] *NewScientist* (Dec. 17, 2013). "Mind-reading light helps you stay in the zone," http://www.newscientist.com/article/mg22029484.500-mindreading-light-helps-you-stay-in-the-zone.html

[3] *TuftsNow* (Feb. 4, 2014) "A Load off Your Mind," http://now.tufts.edu/articles/load-your-mind

[4] *The Boston Globe* (Mar. 3, 2014). "Headband could help brain communicate with computers," http://www.bostonglobe.com/business/2014/03/03/headband-could-help-brain-comunicate-with-computers/90HC7YkJtl2iRNoKw0fnEJ/story.html

[5] *NewScientist* (Apr. 2, 2014). "Google Glass hackathon spawns bizarre no-touch apps," http://www.newscientist.com/article/mg22229634.200-google-glass-hackathon-spawns-bizarre-notouch-apps.html

[6] *China Central Television* (May 4, 2014). "Brain Power," http://www.cctv-america.com/2014/05/04/full-frame-essay-brain-power

[7] *WBUR Radio Boston* (May 16, 2014). "Tufts Researchers Develop Mind-Reading Headband," http://radioboston.wbur.org/2014/05/16/tufts-headband-mind

Awards and Recognitions

[1] Doctoral Symposium presenter, ACM Symposium on User Interface Software and Technology (UIST) 2014, Oct. 2014

[2] Tufts University Graduate School of Arts & Sciences Student Travel Award, July 2014

[3] Tufts University 2014 Stephen and Geraldine Ricci Interdisciplinary Prize, *A Wireless Device to Monitor Blood Oxygen Concentration in Tissue to Aid in Developing an Adaptive Information Delivery System*, May 2014 [Awarded annually to student teams that best demonstrate interdisciplinary engineering design and entrepreneurial spirit]

[4] Tufts University Graduate School of Arts & Sciences Outstanding Graduate Student Contribution to Undergraduate Education, Special Mention, Apr. 2014

[5] Best Paper Award Honorable Mention, ACM Conference on Human Factors in Computing Systems (CHI), 2014 [Awarded to top 5%]

[6] Google Glass Research Award, *Using Passive Brain Input for Adaptive Glass Information Delivery*, June 2013

[7] Tufts University Graduate School of Arts & Sciences Student Research Award, Oct. 2013