Daniel A. Afergan

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Research Experience

Employment

Jun. 2015–Present **Software Engineer**, *Google Inc.*, Mountain View, CA.

Jun. 2005–Dec. 2010 **Advisory Cognitive Scientist**, *U.S. Naval Research Laboratory, Warfighter Human System Integration Laboratory*, Washington, DC.
Researched and conducted experiments to test benefits of immersive locomotive virtual environment, augmented reality, and neurophysiological studies for US Marine Corps infantry training. Developed software and simulations to perform automated real-time mitigations of virtual environments according to physiological measurements.

Internships

Summer 2014 **Software Engineering Intern**, *Google Inc.*, Cambridge, MA.
Developed and researched novel menu flow transitions for visual refinements as part of the Image Search user interface engineering group. Conducted live traffic user studies and performed large-scale data analysis.

Summer 2011 **Research Intern**, *Charles River Analytics*, Cambridge, MA.
Created complex social interaction virtual environments for Human Social Culture Behavior (HSCB) Modeling projects.

Education

August 2015 **Ph.D. Computer Science**, *Tufts University*.

May 2009 **M.S. Computer Science**, *The George Washington University*.

May 2005 **B.A. Cognitive Science**, *University of Pennsylvania*.
Minors: Psychology and Computer Science & Engineering

Awards and Honors

- Doctoral Symposium presenter, ACM Symposium on User Interface Software and Technology (UIST) 2014
- Tufts University Graduate School of Arts and Sciences Student Travel Award, 2014
- 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*, 2014 [Awarded annually to student teams that best demonstrate interdisciplinary engineering design and entrepreneurial spirit]
- Tufts University Graduate School of Arts and Sciences Outstanding Graduate Student Contribution to Undergraduate Education, Special Mention, 2014
- Best Paper Award Honorable Mention, ACM Conference on Human Factors in Computing Systems (CHI), 2014 [Awarded to top 5%]
- Google Glass Research Award, *Using Passive Brain Input for Adaptive Glass Information Delivery*, 2013
- Tufts University Graduate School of Arts and Sciences Student Research Award, 2013

Publications

Conference Proceedings

[1] Daniel Afergan, Samuel W Hincks, Tomoki Shibata, and Robert J K Jacob. Phylter: A system for modulating notications in wearables using physiological sensing. In *Proceedings of Human-Computer Interaction International*. Springer, 2015.

[2] Daniel Afergan. Using brain-computer interfaces for implicit input. In *Proceedings of the adjunct publication of the 27th annual ACM symposium on User Interface Software and Technology*, pages 13–16. ACM, 2014.

[3] Daniel Afergan, Evan M Peck, Erin T Solovey, Andrew Jenkins, Samuel W Hincks, Eli T Brown, Remco Chang, and Robert J K Jacob. Dynamic difficulty using brain metrics of workload. In *Proceedings of the 32nd annual ACM conference on Human Factors in Computing Systems*, pages 3797–3806. ACM, 2014. **Best Paper Award Honorable Mention**.

[4] Daniel Afergan, Tomoki Shibata, Samuel W Hincks, Evan M Peck, Beste F Yuksel, Remco Chang, and Robert J K Jacob. Brain-based target expansion. In *Proceedings of the 27th Annual ACM Symposium on User Interface Software and Technology*, pages 583–593. ACM, 2014.

[5] Evan M Peck, Daniel Afergan, and Robert J.K. Jacob. Investigation of fNIRS brain sensing as input to information filtering systems. In *Proceedings of the 4th Augmented Human International Conference*, pages 142–149. ACM, 2013.

[6] Linda E Sibert, James N Templeman, Roy M Stripling, Joseph T Coyne, Robert C Page, Zina La Budde, and Daniel Afergan. Comparison of locomotion interfaces for immersive training systems. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, pages 2097–2101. SAGE Publications, 2008.

[7] Beste F Yuksel, Daniel Afergan, Evan M Peck, Garth Griffin, Lane Harrison, Nick WB Chen, Remco Chang, and Robert J.K. Jacob. BRAAHMS: A novel adaptive musical interface based on users' cognitive state. In *Proceedings of the ACM International Conference on New Interfaces for Musical Expression*, 2015.

[8] Beste F Yuksel, Kurt B Oleson, Lane Harrison, Evan M Peck, Daniel Afergan, Remco Chang, and Jacob Robert J.K. Learn piano with BACh: An adaptive learning interface that adjusts task difficulty based on brain state. In *Proceedings of the 33nd annual ACM conference on Human Factors in Computing Systems*. ACM, 2016 (In Press).

[9] Beste F Yuksel, Evan M Peck, Daniel Afergan, Samuel W Hincks, Tomoki Shibata, Jana Kainerstorfer, Kristen Tgavalekos, Angelo Sassaroli, Sergio Fantini, and Robert J.K. Jacob. Functional near-infrared spectroscopy for adaptive human-computer interfaces. In *SPIE BiOS*, pages 93190R–93190R. International Society for Optics and Photonics, 2015.

Journal Articles

[10] Stephen P Bailey, Craig Holt, Kent C Pfluger, Zina La Budde, Daniel Afergan, Roy Stripling, Paul C Miller, and Eric E Hall. Impact of prolonged exercise in the heat and carbohydrate supplementation on performance of a virtual environment task. *Military Medicine*, 173(2):187–192, 2008.

[11] Stephen P Bailey, K C Pfluger, Craig Holt, Zina La Budde, Daniel Afergan, Simon Bartlett, Roy Stripling, Paul C Miller, and Eric E Hall. Changes in performance of a virtual reality task subsequent to prolonged exercise in the heat and carbohydrate supplementation. *Medicine & Science in Sports & Exercise*, 38(5):S269–S270, 2006.

[12] Erin T Solovey, Daniel Afergan, Evan M Peck, Samuel W Hincks, and Robert J K Jacob. Designing implicit interfaces for physiological computing: Guidelines and lessons learned using fNIRS. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 21(6):35, 2015.

Book Chapters

[13] Daniel Afergan and Joel L Davis. Promising directions for improved training, learning, and memory. In *Foundations of Augmented Cognition*. Springer Berlin Heidelberg, 2007.

[14] Evan M Peck, Daniel Afergan, Beste F Yuksel, Francine Lalooses, and Robert J K Jacob. Using fNIRS to measure mental workload in the real world. In *Advances in Physiological Computing*, pages 117–139. Springer London, 2014.

[15] Roy Stripling, Joseph T Coyne, Anna Cole, Daniel Afergan, Raymond L Barnes, Kelly A Rossi, Leah M Reeves, and Dylan D Schmorrow. Automated SAF adaptation tool (ASAT). In *Foundations of Augmented Cognition*, pages 346–353. Springer Berlin Heidelberg, 2007.

[16] Emmanuelle Tognoli, Attila J Kovacs, Benjamin Suutari, Daniel Afergan, Joseph T Coyne, Gregory Gibson, Roy Stripling, and J A Scott Kelso. Behavioral and brain dynamics of team coordination part I: task design. In *Foundations of Augmented Cognition. Directing the Future of Adaptive Systems*, pages 257–264. Springer, 2011.

[17] Emmanuelle Tognoli, Attila J Kovacs, Benjamin Suutari, Daniel Afergan, Joseph T Coyne, Gregory Gibson, Roy Stripling, and J A Scott Kelso. Behavioral and brain dynamics of team coordination part II: neurobehavioral performance. In *Foundations of Augmented Cognition. Directing the Future of Adaptive Systems*, pages 376–382. Springer, 2011.

Poster Presentations

[18] Daniel Belyusar, Bryan Reimer, Bruce Mehler, Daniel Afergan, Joseph F Coughlin, and Erin T Solovey. Utilizing functional near-infrared spectroscopy to identify cognitive processes contributing to workload in a dual-task environment. In *Society for Neuroscience Annual Meeting*, 2014.

[19] Samuel W Hincks, Daniel Afergan, and Robert J.K. Jacob. Using passive brain input for adaptive glass information delivery. In *Google Glass Research Workshop*, 2013.

[20] Attila J Kovacs, Emmanuelle Tognoli, Daniel Afergan, Joseph T Coyne, Gregory Gibson, Roy Stripling, and J A Scott Kelso. Behavioral and brain dynamics of team coordination. In *Society for Neuroscience Annual Meeting*, 2011.

[21] Attila J Kovacs, Emmanuelle Tognoli, Daniel Afergan, Joseph T Coyne, Gregory Gibson, Roy Stripling, and J A Scott Kelso. Brain dynamics of coordinated teams. In *Society for Neuroscience Annual Meeting*, 2010.

[22] Tomoki Shibata, Evan M Peck, Daniel Afergan, Samuel W Hincks, Beste F Yuksel, and Robert J.K. Jacob. Building implicit interfaces for wearable computers with physiological inputs: zero shutter camera and phylter. In *Proceedings of the adjunct publication of the 27th annual ACM symposium on User interface software and technology*, pages 89–90. ACM Press, 2014.

Other Publications

[23] Daniel Afergan, Evan M Peck, Remco Chang, and Robert J K Jacob. Using passive input to adapt visualization systems to the individual. In *ACM CHI 2013 Workshop, Many People, Many Eyes: Aggregating Influences of Visual Perception on User Interface Design*, 2013.

[24] Daniel A Afergan. *Implicit Brain-Computer Interfaces for Adaptive Systems: Improving Performance through Physiological Sensing.* PhD thesis, Tufts University, 2015.

[25] Daniel A Afergan. Speed-accuracy comparison of navigational interfaces. Master's thesis, The George Washington University, 2009.

[26] Joseph T Coyne, Roy Stripling, Kent C Pfluger, Zina La Budde, and Daniel Afergan. Company and below command and control information exchange study. Technical report, U.S. Naval Research Laboratory, Washington DC, 2007.

[27] Erin T Solovey, Daniel Afergan, Arudra Venkat, Daniel Belyusar, Bruce Mehler, and Bryan Reimer. Enabling adaptive autonomy: Brain & body sensing for adaptive vehicles. In *ACM CHI 2015 Workshop, Experiencing Autonomous Vehicles: Crossing the Boundaries between a Drive and a Ride*, 2015.

[28] Roy Stripling, James N Templeman, Sibert Linda E, Joseph T Coyne, Robert G Page, Zina La Budde, and Daniel Afergan. Identifying interface limitations for virtual environment training systems. In *Department of Defense Human Factors Engineering Technical Group Meeting 2006*, 2006.

[29] Roy M Stripling, James N Templeman, Linda E Sibert, Joseph Coyne, Robert G Page, Zina La Budde, and Daniel Afergan. Identifying virtual technologies for USMC training. *2006 NRL Review*, 6, 2006.

[30] Beste F Yuksel, Daniel Afergan, Evan M Peck, Garth Griffin, Lane Harrison, Nick W.B. Chen, Remco Chang, and Robert J.K. Jacob. Implicit brain-computer interaction applied to a novel adaptive musical interface. Technical report, TR-2015-01, Department of Computer Science, Tufts University, 2015.

Invited Talks

- MIT Lincoln Laboratory, *Adaptive Strategies for Implicit Interfaces using Physiological Computing*, Apr. 22, 2014
- 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
- Guest lecture, CS220: Human-Computer Interaction. Wellesley College, Apr. 17, 2014

- 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
- MIT Humans and Automation Lab Colloquium, *Dynamic UAV Interface Using Brain Measures to Modulate Workload*, Oct. 10, 2012
- Tufts University Colloquium: Research Talk, *Pointing Performance of the Xbox 360 Controller, Wii Remote, And Mouse*, Apr. 5, 2012

Press

- *BBC News* (May 27, 2014). "The headband that measures boredom," http://www.bbc.com/news/world-us-canada-27578867
- *WBUR Radio Boston* (May 16, 2014). "Tufts Researchers Develop Mind-Reading Headband," http://radioboston.wbur.org/2014/05/16/tufts-headband-mind
- *China Central Television* (May 4, 2014). "Brain Power," http://www.cctv-america.com/2014/05/04/full-frame-essay-brain-power
- *New Scientist* (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
- *The Times (London)* (Mar. 5, 2014). "Warning: your brain is overheating," http://www.thetimes.co.uk/tto/science/article4023140.ece
- *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
- *TuftsNow* (Feb. 4, 2014) "A Load off Your Mind," http://now.tufts.edu/articles/load-your-mind
- *New Scientist* (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
- *Research at Google* (Sep. 11, 2013). "Wearable Computing research with +Google Glass," http://plus.google.com/+ResearchatGoogle/posts/Y6hqwiFzppk
- *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

Teaching Experience

- Teaching Assistant and Mentor: Google Computer Science Summer Institute, Summer 2014
- Workshop Organizer: Physiological and Brain Interfaces, Fall 2012, and Human-Computer Interaction for Music, Fall 2013
- Teaching Assistant: Object-Oriented Programming for Graphical User Interfaces, Fall 2011
- Teaching Assistant: Visual Basic for Business Applications, Spring 2011

Advising

Undergraduate Thesis
- Andrew Jenkins
  Thesis Advisor: Robert Jacob

- Enshu Chawla
  Thesis Advisor: Robert Jacob

Master's Thesis

- Tomoki Shibata
  Thesis Advisor: Robert Jacob
- Shiwan Zuo
  Thesis Advisor: Robert Jacob
- Orkun Ozbek
  Thesis Advisor: Remco Chang

Outreach

- New England Chapter Human Factors and Ergonomics Society Secretary, 2014-Present
- Boston Maccabi Rugby Club Football Club Social Chair, 2012-2013
- Human Factors and Ergonomics Society Augmented Cognition Technical Group Newsletter Chair, 2008-2010

Service

University

- Tufts Graduate School of Arts and Sciences Student Research Award, Judge, Spring and Fall 2014
- TuftsIgnite research seminar founder, 2014
- Tufts Graduate School of Arts and Sciences Policy and Programs Committee, Student Representative, 2013-2014
- Tufts Graduate Student Council, Academic Chair, 2013-2014
- Tufts Graduate Student Council, Computer Science Department Representative, 2012-2014
- Penn Alumni Interviewer, 2006-Present

Conference Program Committee

- ACM Conference on Human Factors in Computing Systems (CHI) Late-Breaking Work 2016
- ACM International Conference on Intelligent User Interfaces (IUI) 2016
- International Workshop on Symbiotic Interaction 2014

Conference Organization

- ACM IUI 2016 Student Volunteer Chair
- ACM CHI Social Media Chair 2015 - Present

Reviewing

- ACM CHI 2012-2016
- ACM IUI 2016
- Frontiers in Human Neuroscience 2016
- International Journal of Human-Computer Studies 2015-2016
- ACM Symposium on User Interface Software and Technology (UIST) 2012-2015
- Journal of Human Computation 2015
- IEEE Computer 2015

- Graphics 2015
- Nordic Conference on Human-Computer Interaction (NordiCHI) 2014
- ACM Designing Interactive Systems (DIS) 2014
- ACM International Conference on Multimodal Interaction (ICMI) 2012
- Presence Journal 2010

Student Volunteer

- ACM IUI 2016
- ACM CHI 2011-2015
- ACM UIST 2012
- ACM Tangible, Embedded and Embodied Interaction (TEI) 2011