

Timothy Raymond Brick, PhD

PERSONAL INFORMATION

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Citizenship:

USA

FORMAL EDUCATION

PhD Psychology August 2011

University of Virginia, Charlottesville, VA (advisor Steven M. Boker)

Dissertation Title: *(Re)moving Parts: Towards A System for the Separation of Affective Movements in Facial Video*

MS Computer Science and Engineering August 2007

University of Notre Dame, Notre Dame, IN (primary advisor Matthias Scheutz)

Thesis Topic: *TIDE: A Timing-sensitive Incremental Discourse Engine*

BA Psychology May 2002

Magna Cum Laude University of Notre Dame, Notre Dame, IN

BS Computer Science and Engineering May 2001

Magna Cum Laude University of Notre Dame, Notre Dame, IN

PROFESSIONAL ACADEMIC POSITIONS

2011-present: *Forschungsstipendiat (Postdoctoral Research Fellow)*, Formal Methods Project, Center for Lifespan Psychology, Max Planck Institute for Human Development

Summer 2009: *Visiting Pre-doctoral Fellow*, Center for Lifespan Psychology, Max Planck Institute for Human Development

Fall 2008: *Adjunct Professor*, Department of Psychology, University of Virginia.
Co-instructor for Introductory Graduate Statistics

2007–2011: *Graduate Student*, Department of Psychology, University of Virginia.

2005–2007: *Graduate Student*, Joint PhD Program in Computer Science and Psychology, University of Notre Dame

HONORS AND AWARDS

Predocctoral Fellow (2009-2010) National Institute on Aging Training Grant–Quantitative Modeling in Aging Research. Grant Number: T32 AG20500-08 PI: John R. Nesselroade, University of Virginia.

LIFE Program Fellow/Fellow Speaker (2008-2010) appointed to represent the Virginia fellows as a member of the steering committee.

Presidential Fellow (2007-2011) from the University of Virginia.

Eli J. Lily Presidential Fellow (2005-2007) from the University of Notre Dame.

John D. Reilly Scholar (2002) for excellence in interdisciplinary undergraduate studies.

PEER REVIEWED ARTICLES, PAPERS, AND ABSTRACTS

- von Oertzen, T., & **Brick, T. R.** (in press). Efficient Hessian Computation Using Sparse Matrix Derivatives in RAM Notation. *Behavior Research Methods*. doi: 10.3758/s13428-013-0384-4.
- Brick, T. R.**, & Boker, S. M. (2011). Correlational Methods for Analysis of Dance Movements. *Dance Research*, 29(2), 283-304. doi: 10.3366/drs.2011.0021.
- Boker, S., Neale M., Maes, H., Wilde, M., Spiegel, M., **Brick, T.**, Spies, J., Estabrook, R., Kenny, S., Bates, T., Mehta, P, & Fox J. (2011). OpenMx: An Open Source Extended Structural Equation Modeling Framework. *Psychometrika*. doi: 10.1007/s11336-010-9200-6.
- Boker, S., Cohn, J., Theobald, B., Matthews, I., Mangini, M., Spies, J., Amabadar, Z. & **Brick, T.** (2011) Something in the Way We Move: Motion Dynamics, not Perceived Sex, Influence Head Movements in Conversation. *Journal of Experimental Psychology: Human Perception & Performance*. 37(2), 631-640. doi: 10.1037/a0021928.
- Brick, T. R.**, Hunter, M. D., & Cohn, J. (2009). Towards Automatic Coding of Facial Expression [Abstract]. *Multivariate Behavioral Research*. doi: 10.1080/00273170903467356.
- Brick, T. R.**, Hunter, M. D., & Cohn, J. (2009). Get the FACS Fast: Automated FACS face analysis benefits from the addition of velocity. *Proceedings of the 2009 International Conference on Affective Computing & Intelligent Interactions (ACII 2009)*. doi: 10.1109/ACII.2009.5349600.
- Boker, S., Cohn, J., Theobald, B., Matthews, I., **Brick, T.**, & Spies, J. (2009) Effects of Damping Facial Expression in Dyadic Conversation Using Real-Time Facial Expression Tracking and Synthesized Avatars. *Philosophical Transactions of the Royal Society B*, 364(1535). doi: 10.1098/rstb.2009.0152.
- Brick, T. R.**, Spies, J. R., Theobald, B.-J., Matthews, I. & Boker, S. M. (2009). High-Presence, Low-Bandwidth, Apparent 3D Video-conferencing With A Single Camera. *Proceedings of the 10th International Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS 2009)*. doi: 10.1109/WIAMIS.2009.5031494.
- Theobald, B., Matthews, I., Mangini, M., Spies, J., **Brick, T.**, Cohn, J. F. & Boker, S. (2009) Mapping and Manipulating Visual Prosody. *Journal of Language and Speech*, 52(2/3), 369–386. doi: 10.1177/0023830909103181.
- Brick, T. R.**, Schermerhorn, P.W., & Scheutz, M. (2007). Speech and Action: Integration of Action and Language for Mobile Robots. *Proceedings of the 2007 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2007)*, 1423–1428. doi: 10.1109/IROS.2007.4399576.
- Brick, T.**, & Scheutz, M. (2007). Incremental Natural Language Processing for HRI. *Proceedings of the Second ACM IEEE International Conference on Human-Robot Interaction (HRI 2007)*. doi: 10.1145/1228716.1228752.

MANUSCRIPTS IN PROCESS

* indicates supervised students

Boker, S. M., **Brick, T. R.**, von Oertzen, T., Estabrook, R., Pritikin, J. N., Hunter, M. D., Maes, H.H., & Neale, M. C. (under revision). Maintained Individual Data Distributed Likelihood Estimation (MIDDLE).

Jednoralski, D.* , Nehls, R.* , & **Brick, T.R.** (under revision). A Low-Cost Balance Prosthesis for the Study of Vibrotactile Influences on Human Postural Stability.

MANUSCRIPTS IN PREPARATION

Volhard, J., Perdikis, D., Müller, V., Kaulard, K., **Brick, T.R.**, Walraven, C., and Lindenberger, U. (in preparation). Brain Synchronization During Perception of Facial Emotional Expressions of Natural and Unnatural Dynamics.

Brick, T. R., Estabrook, R., Spiegel, M. (in preparation). Models and Model Trees.

Brick, T. R., and Neale, M.C. (in preparation). Simultaneous Maximum Likelihood Optimization of Ordinal and Continuous Variables.

SOFTWARE PUBLICATIONS

Boker, S. M., Neale, M. C., Maes, H. H., Wilde, M. J., Spiegel, M., **Brick, T. R.**, Estabrook, R., Bates, T. C., Mehta, P., von Oertzen, T., Gore, Ross J., Hunter, M. D., Hackett, D. C., Karch, J., and Brandmaier, A. M. (2012) *OpenMx: Extended Structural Equation Modeling Framework (Latest Version 1.3)*, <http://openmx.psyc.virginia.edu/>. Role: Primary developer, computational kernel.

PATENTS

Boker, S.M., **Brick, T. R.**, & Spies, J. R. “System, Computer Program Product and Method for Low Bandwidth Videoconferencing with Motion Parallax.” U.S. Provisional Patent Application No. 61/235,549 (Supplemental), filed August 20, 2009.

GRANT WRITING EXPERIENCE

Beaumont Foundation of America Educational Institution Pilot Grant Funded by Beaumont Foundation of America. August 2003–May 2004; Grant in kind: \$45,000 Equipment Total Costs. Role: Grant Co-author; Grant Administrator.

Teca Oyate Waonspekiya Americorps National Service Grant Funded by Corporation for National Public Service. December 2003–November 2006; \$633,000 Total Costs. Role: Grant Co-author; Negotiator for final funding allocation; Interim Administrator.

Wakanyeja kin Wokiye Owicakiyapi 21st Century Learning Center Funded by South Dakota Department of Education and Cultural Affairs; January 2004–December 2009; \$600,000 Total Costs. Role: Grant Author.

OTHER SELECTED SOFTWARE PROJECTS

* indicates supervised students

Brick, T. R., Jednoralski, D.* , Nehls, R.* , and Verrel, J. (2012) “Vestibular Augmentation System, Version 0.1.” Hardware and software system for augmentation of vestibular stabilization in older adults.

Brick, T. R., Braun, J.* , Harrill, C., & Yu, M. (2011) “Face Modeling GUI.” Software for facial expression analysis and stimulus synthesis. Includes Open-Sourced code from the DeMoLib by Saragih and Goecke, and from a framework by J.R. Spies.

Brick, T. R. “TIDE: Timing-sensitive Incremental Discourse Engine.” A module for incremental discourse understanding and generation for the DIARC Robotic Architecture.

SELECTED CONFERENCE / WORKSHOP TALKS and POSTERS

Brick, T. R. (2013) Multilevel SEM: Towards a Common Specification. Presented at the 25th Annual Convention for the Association for Psychological Science (APS 2013); Washington, DC, USA; May 24, 2013.

Brick, T. R. & Brandmaier, A. M. (2012) Modeling Facial Expression Mirroring in Conversation. Presented at the *17th Herbstakademie: The Implications of Embodiment–Enactive, Clinical, Social*; Heidelberg, Germany; October 2, 2012.

Brick, T. R. (2012) Facing the Odds: Bayesian Modeling of Facial Expression Data. Presented to the *MPS/UCL Symposium on Computational Psychiatry and Aging*; Ringberg, Germany; September 21, 2012.

- Brick, T. R.** (2012) Dyadic Longitudinal Models (and a bit about Ergodicity). Presented at the *2nd Annual INAPIC Fall Workshop: Longitudinal Methods to Analyze Brain-Behavior Relationships*; Zurich, Switzerland; September 15, 2012.
- Brick, T. R.** (2011) Time-Frequency Transformation for the Separation of Speech and Affect in Facial Movements. Presented at *New England Sequencing and Timing*; Amherst, MA; March 5, 2011.
- Brick, T. R.**, & Boker, S. M. (2010) Introduction to Dynamical Systems Analysis. *Advanced Genetic Epidemiology and Statistical Molecular Genetics Workshop*; Richmond, Virginia; October 20, 2010.
- Brick, T. R.**, Hunter, M. D., & Cohn, J. (2009) Towards Automatic Recognition of Facial Affect. *Annual Meeting of the Society of Multivariate Experimental Psychology*; Salishan, Oregon; October 9, 2009.
- Brick, T. R.**, Hunter, M. D., & Cohn, J. (2009) Get the FACS Fast: Automated FACS face analysis benefits from the addition of velocity. Presented to the *2009 International Conference on Affective Computing & Intelligent Interactions (ACII 2009)*.; Amsterdam, Netherlands.
- Brick, T. R.**, Spies, J. R., Theobald, B.-J., Matthews, I. & Boker, S. M. (2009) High-Presence, Low-Bandwidth, Apparent 3D Video-conferencing With A Single Camera. Presented to the *9th International Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS 2009)*; London, England; May 6–8, 2009.
- Brick, T. R.**, & Boker, S. M. (2009) Synchronization with Ambiguous Auditory Rhythms During Unstructured Dance. Presented to the *New England Sequencing and Timing 2009*; New Haven, Connecticut; March 7, 2009.
- Brick, T. R.**, Boker, S. M., Waddell, J. R., & Covey, E.S. Effects of Ambiguous Rhythmic Stimuli on Unconstrained Dance. *2007 Auditory Perception, Action and Cognition Meeting*, Long Beach, California; November 16–18 2007.
- Brick, T. R.**, Schermerhorn, P. W., & Scheutz, M. Speech and Action: Integration of Action and Language for Mobile Robots. *2007 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS '07)*, San Diego, California; October 28 – November 2, 2007.
- Brick, T.** & Scheutz, M. (2007) Incremental Natural Language Processing for HRI. Poster presented at the *Second ACM IEEE International Conference on Human-Robot Interaction*, Boston, Massachusetts; March 2007.
- Brick, T. R.**, Boker, S. M., & Waddell, J. L. (2006) Joint Location and Angle Extraction for Pose Estimation from Underconstrained Motion Capture Data. Presented at the *Annual Conference of the North American Association for Computational, Social, and Organizational Science*, Notre Dame, Indiana; June 22–23, 2006.

GRADUATE AND UNDERGRADUATE TEACHING EXPERIENCE

Adjunct Faculty Quantitative Methods I (PSY 771) with Ryne Estabrook. University of Virginia. Fall 2008. Co-instructor with another graduate student. Designed curriculum, wrote and presented lectures, prepared labs, designed, administered, and graded tests, managed teaching assistants. 771 is the first course of the required graduate statistics instruction. Nominated for a teaching award.

Selected Student Evaluations: (5=Strongly Agree, 1=Strongly Disagree)

- Overall, the instructor was an effective teacher: 4.82 (Psyc department mean 4.21)
- Overall, this was a worthwhile course: 4.33 (Psyc department mean 4.26)
- The instructor was approachable and made himself/herself available to students outside the classroom: 4.82 (Psyc department mean 4.21)

Teaching Assistant APA Advanced Training Institute: Structural Equation Modeling in Longitudinal Research, Charlottesville, VA; May 2010.

Teaching Assistant Structural Equation Modeling in OpenMx. Charlottesville, VA; May 2010.

Teaching Assistant Psycholinguistics (PSY 428) under Dr. Kathleen Eberhard. University of Notre Dame. Fall 2002.

OTHER SELECTED TEACHING EXPERIENCE

Instructor “Introduction to Structural Equation Modeling”. Workshop at the Max Planck Institute for Human Development, Berlin. April 26, 2013.

Instructor “Structural Equation Modeling”. Workshop at the Freie Universität, Berlin. March 14–15, 2013.

Faculty Workshop: “2nd Annual INAPIC Fall Workshop: Longitudinal Methods to Analyze Brain-Behavior Relationships”. Zurich, Switzerland; August 2012.

Faculty Workshop: “New methods for conceptualizing, analyzing, and visualizing dyadic data within and across persons”. Zurich, Switzerland; August 2011.

Faculty 2010 International Workshop on Statistical Genetics and Methodology of Twin and Family Studies. Boulder, CO; March 2010.

Guest Lecturer “Avatars, Embodiment, and Artificial Intelligence”. Given to Artificial Intelligence (CS 416) for Dr. Worthy Martin. 2008, 2009, and 2011.

High School Teacher Red Cloud Indian School. Fall 2002 – Spring 2005.

PROFESSIONAL AND DEPARTMENTAL SERVICE

Coordinator High School student praktikum at the Max Planck Institute (three students, 2012-2013)

Coordinator MPI School workshop for local High School math competition team

Designer / Creator Introduction, Welcome, and Demonstration Video for a retreat between the University of Virginia Office of the Vice President of Research and potential corporate partners.

Reviewer Psychological Methods, Perception, Experimental Gerontology, Journal of the Royal Society-Interface, Frontiers in Quantitative Psychology, Journal of Consulting and Clinical Psychology, Dance Research Electronic. Applied Perception in Graphics and Visualization (APGV), International Conference on Affective Computing & Intelligent Interactions (ACII), International Conference on Intelligent Robots and Systems (IROS). Student Session for the Annual Meeting of the Society for Multivariate Experimental Psychology (SMEP).

Co-Chair, Professional Issues Committee Fall 2008–Spring 2009 Department of Psychology, University of Virginia.

Professional Seminar Instructor Fall 2007, Fall 2008 & Fall 2010. Single-session seminar on L^AT_EX typesetting system.

PAST and CURRENT PROFESSIONAL MEMBERSHIPS

American Psychological Association (APA), Association for Psychological Science (APS), Association for Computing Machinery (ACM), Institute of Electrical and Electronic Engineers (IEEE), Society for Mathematical Psychology, Psychometric Society.