

RESUMÉ — ANDREW T. DUCHOWSKI

PERSONAL DATA

Associate Professor
School of Computing
Clemson University
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EDUCATION

Ph.D., Texas A&M University, 1997, Computer Science
B.Sc., Simon Fraser University, 1990, Computer Science

PROFESSIONAL EXPERIENCE

Clemson University, 2002–, Associate Professor of Computer Science
Clemson University, 1998–2002, Assistant Professor of Computer Science
Texas A&M University, 1997–1997, Postdoctoral Research Associate (Computer Science)
1996–1997, Graduate Assistant Research
1995–1995, Lecturer
Texas Transportation Institute, 1995–1995, Graduate Assistant Research
Texas A&M University, 1994–1994, Graduate Assistant Teaching (Computer Science)
Texas A&M University, 1990–1994, Graduate Assistant Research (Industrial Engineering)
Simon Fraser University, 1990–1990, Research Assistant (Computer Science)
1989–1989, Teaching Assistant (Computer Science)

CONSULTING EXPERIENCE

PhotoAssist, Inc. (sub-contractor for United States Postal Service), 1999 (reviewer of artwork).
Lumint, Inc., 2007 (SBIR conception, implementation).

MEMBERSHIPS

Member, EuroGraphics (2001–)
Member, SIGGRAPH (2000–)
Member, Association for Computing Machinery, ACM (1990–)
Member, Institute for Electronics and Electrical Engineers, IEEE (1990–)
Member, Society of Photo-Optical Instrumentation Engineers, SPIE (1990–2000)

PROFESSIONAL ACTIVITIES

University of British Columbia, Electrical and Computer Engineering, External Examiner, PhD Dissertation of Craig Hennessey (2008).
ACM ASSETS 08, Member, Program Committee (2008).
IEEE Transactions on Biomedical Engineering, Reviewer (2008).
National Institutes of Health (NIH), Reviewer, R03, small research grants (2008).
Presence, Reviewer (2008).
University of Joensuu, Department of Computer Science and Statistics, Opponent, PhD Defense of Roman Bednarik, Joensuu, Finland (2007).
ACM Transactions on Graphics, Reviewer (2007).
IEEE Transactions on Systems, Man, and Cybernetics-Part B: Cybernetics, Reviewer (2007).
Neurocomputing, Reviewer (2007).
TOCHI, Paper Reviewer (2005).
SIGGRAPH, Paper Reviewer (2005).
SIGCHI, alt.chi Co-Chair (2005).
Natural Sciences and Engineering Research Council of Canada (NSERC), Proposal Reviewer (2004).
CVIU Special Issue on Eye Detection and Tracking, Guest Editor (2004).
SIGGRAPH, Course Reviewer (2004).
SIGCHI, Paper Reviewer (2004, 2006, 2007).

Linköping University, Image Coding Group, Opponent, PhD Defense of Peter Bergstrom, Linköping, Sweden (2003).
McGraw-Hill, Reviewer (computer science textbook) (2003).
Prentice-Hall, Reviewer (computer science textbook) (2003).
Elsevier Science, Reviewer (computer science textbook) (2003).
Addison-Wesley Publishers, Reviewer (computer science textbook) (1999, 2001).
International Journal of Human-Computer Studies, Reviewer (2003).
Civilian Research & Development Foundation, Reviewer, research grant proposals (2003).
SIGGRAPH, Paper Reviewer (tertiary) (2003).
Web3D Symposium, Reviewer (2002).
Research Grants Council of Hong Kong, Reviewer, research grant proposals (2002).
Journal of Behavior Research Methods, Instruments, & Computers (BRMIC), Reviewer (2002).
Eye Tracking Research & Applications (ETRA) Symposium, General Co-Chair (2000,2002,2004,2006,2008).
National Science Foundation (NSF), Panelist, regular research proposals (2000,2001).
Oak Ridge Affiliated Universities (ORAU), Referee, regular research proposals (1999).
IEEE Transactions on Circuits and Systems for Video Technology, Reviewer (1998).

PUBLICATIONS

Books and Monographs

Duchowski, A. T., *Eye Tracking Methodology*, Springer-Verlag, London, UK, 2nd ed., 2007.
Duchowski, A. T., *Eye Tracking Methodology*, Springer-Verlag, London, UK, 2003.

Book Chapters

Duchowski, A. T., Eye Tracking, in *Encyclopedia of Human-Computer Interaction*, William Sims Bainbridge, Ed., Berkshire Publishing Group, Great Barrington, MA, 2004, pp.251-254.

Refereed Journal Publications

Duchowski, A. T., Bate, D., Stringfellow, P. F., Thakur, K., Melloy, B. J., and Gramopadhye, A. K., "On Spatiochromatic Visual Sensitivity and Peripheral Color LOD Management", *Transactions on Applied Perception*, 2008 (to appear).

Murphy, H. A., Duchowski, A. T., and Tyrrell, R. A., "Hybrid Image/Model-Based Gaze-Contingent Rendering", *Transactions on Applied Perception*, 2008 (to appear).

Baladi, M., Vitali, H., Fadel, G., Summers, J., and Duchowski, A., "A taxonomy for the design and evaluation of networked virtual environments: its application to collaborative design", *International Journal of Interactive Design and Manufacturing*, 2, 2008, pp. 17-32.

Duchowski, A. T. and Çöltekin, Arzu, "Foveated Gaze-Contingent Displays for Peripheral LOD Management, 3D Visualization, and Stereo Imaging", *Transactions on Multimedia Computing, Communications, and Applications*, 3(4), Dec. 2007.

Melloy, B. J., Das, S., Gramopadhye, A. K., Duchowski, A. T., "A Model of Extended, Semi-Systematic Visual Search", *Human Factors*, 48(3), Dec. 2006, pp.540-554.

Duchowski, A. T., "A Breadth-First Survey of Eye Tracking Applications", *Behavior Research Methods, Instruments, & Computers*, Nov. 2002.

Duchowski, A. T., Medlin, E., Cournia, N. A., Murphy, H. A., Gramopadhye, A. K., Nair, S. N., Vorah, J., Melloy, B. J., "3D Eye Movement Analysis", *Behavior Research Methods, Instruments, & Computers*, Nov. 2002.

Vora, J., Nair, S. N., Gramopadhye, A. K., Duchowski, A. T., Melloy, B. J., Kanki, B., "Using Virtual Reality Technology for Aircraft Inspection Training: Presence and Comparison Studies", *Applied Ergonomics*, 33, 2002, pp. 559-570.

Gramopadhye, A. K., Duchowski, A. T., Melloy, B. J., Kanki, B., Vora, J., Nair, S. N., Orhan, S., Shivashankaraiah, V., and Rawls, T., "Using Virtual Reality Technology for Aircraft Inspection Training", *International Journal of Industrial Engineering: Theory, Applications and Practice*, UTEP, ISSN# 1072-4761, 2001.

Duchowski, A. T., "Acuity-Matching Resolution Degradation Through Wavelet Coefficient Scaling", *Transactions on Image Processing*, 9(8), Aug. 2000, IEEE, Piscataway, NJ, pp. 1437-1440.

Burton, B. P., Chow, T. S., Duchowski, A. T., Koh, W., McCormick, B. H., "Exploring the Brain Forest", *Neurocomputing*, 26-27, 1999, Elsevier, pp. 971-980.

Deuermeyer, B. L., Curry, G. L., Duchowski, A. T., and Venkatesh, S., "An Automatic Approach to Deadlock Detection and Resolution in Discrete Simulation Systems", *Journal on Computing*, 9(2), Spring 1997, Institute for Operations Research and the Management Sciences (INFORMS), Linthicum, MD, pp. 195-205.

Conference Proceedings (Reviewed)

Crisler, M., Davenport, B., and Duchowski, A. T., "Aurally Aided Visual Search with Musical Stimuli – An Eye Tracking Analysis", In Proceedings of Human Factors and Ergonomics Society Annual Conference, 2008, New York, NY, HFES.

Gomer, J., Walker, A., Gilles, F., and Duchowski, A. T., "Eye-tracking in a Dual-task Design: Investigating Eye-movements, Mental Workload, and Performance", In Proceedings of Human Factors and Ergonomics Society Annual Conference, 2008, New York, NY, HFES.

Vembar, D., Duchowski, A. T., Sadasivan, S., and Gramopadhye, A. K., "A Haptic Virtual Borescope for Visual Engine Inspection Training", in IEEE Symposium on 3D User Interfaces (3DUI), Mar. 8-9, 2008, Reno, NV, IEEE.

Ryan, W. J., Duchowski, A. T., and Birchfield, S. T., "Limbus/Pupil Switching for Wearable Eye Tracking Under Variable Lighting Conditions", in Eye Tracking Research & Applications (ETRA) (Late Breaking Results), Mar. 26-28, 2008, Savannah, GA, ACM.

Wobbrock, J. O., Rubinstein, J., Sawyer, M. W., and Duchowski, A. T., "Longitudinal Evaluation of Discrete Consecutive Gaze Gestures for Text Entry", in Eye Tracking Research & Applications (ETRA), Mar. 26-28, 2008, Savannah, GA, ACM.

Wobbrock, J. O., Rubinstein, J., Sawyer, M. W., and Duchowski, A. T., "Not Typing but Writing: Eye-based Text Entry Using Letter-like Gestures", in The 3rd COGAIN Annual Conference on Communication by Gaze Interaction, Sep. 3-4, 2007, Leicester, UK, COGAIN.

Duchowski A. T., and Davis, T. A., "Teaching Algorithms and Data Structures through Graphics", in EuroGraphics Education Papers Program, Sep. 3-7, 2007, Prague, Czech Republic, EuroGraphics.

Murphy, H. A. and Duchowski, A. T., "Hybrid Image-/Model-Based Gaze-Contingent Rendering", in Applied Perception in Graphics and Visualization (APGV), Jul. 25-27, 2007, Tuebingen, Germany, ACM.

Heminghous, J. and Duchowski, A. T., "iComp: A Tool for Scanpath Visualization and Comparison", in Applied Perception in Graphics and Visualization (APGV), Jul. 28-30, 2006, Boston, MA, ACM.

Sadasivan, S., Vembar, D., Stringfellow, P. F., Washburn, C., Duchowski, A. T., and Gramopadhye, A. K., "Aircraft Maintenance Technology Education: Integrating Asynchronous Technology and Virtual Reality", In Proceedings of the American Society for Engineering Education (ASEE) Annual Conference and Exposition, Jun. 18-21, 2006, Chicago, IL, ASEE.

Sadasivan, S., Vembar, D., Stringfellow, P. F., Duchowski, A. T., and Gramopadhye, A. K., "Evaluation of Interaction Devices for NDI Training in VR", In Proceedings of Human Factors and Ergonomics Society Annual Conference, 2006, San Francisco, CA, HFES.

Rele R. S., and Duchowski A. T., "Using Eye Tracking to Evaluate Alternative Search Results Interfaces", in Proceedings of the Human Factors and Ergonomics Society, Sep. 26-30, 2005, Orlando, FL, HFES.

Sadasivan S., Rele R., Greenstein J. S., Gramopadhye A. K., Masters, J., and Duchowski A. T., "Collaborative Virtual Environment to Simulate On-The-Job Aircraft Inspection Training Aided by Hand Pointing", in Proceedings of the Human Factors and Ergonomics Society, Sep. 26-30, 2005, Orlando, FL, HFES.

Mehta P., Sadasivan S., Greenstein J. S., Gramopadhye A. K., and Duchowski A. T., "Evaluating Different Display Techniques for Communicating Search Strategy Training in a Collaborative Virtual Aircraft Inspection Environment", in Proceedings of the Human Factors and Ergonomics Society, Sep. 26-30, 2005, Orlando, FL, HFES.

Vembar, D., Sadasivan, S., Duchowski, A. T., Stringfellow, P. F., and Gramopadhye, A. K., "Design of a Virtual Borescope: A Presence Study", in Proceedings of HCI International, Las Vegas, NV, Jul. 22-27, 2005.

Sadasivan, S., Rele, R., Greenstein, J. S., Duchowski, A. T., and Gramopadhye, A. K., "Simulating On-the-Job Training using a Collaborative Virtual Environment with Head Slaved Visual Deictic Reference", in Proceedings of HCI International, Las Vegas, NV, Jul. 22-27, 2005.

Shumberger, M., Duchowski, A. T., and Charlow, K., "Human Factors Engineering in Command, Control & Intelligence (C2I) User Interface Development Process: Use of Eye Tracking Methodology", in Proceedings of the Human Systems Integration Symposium, Jun. 20-22, 2005, Arlington, VA, American Society of Naval Engineers (ASNE).

Sadasivan, S., Mehta, P., Duchowski, A. T., Greenstein J. S., and Gramopadhye, A. K., "Gaze Display in a Collaborative Virtual Aircraft Inspection Training Environment", in Proceedings of the Industrial Engineering Annual Conference, May 14-18, 2005, Atlanta, GA, IIE.

Ashmore, M. Duchowski, A. T., Shoemaker, G., "Efficient Eye Pointing with a Fisheye Lens", in Proceedings GI '05, May 9-11, 2005, Victoria, BC, Canada, Canadian Human-Computer Communications Society (CHCCS)/ACM. *[29% acceptance rate; 104 papers submitted.]*

Sadasivan, S., Greenstein, J. S., Gramopadhye, A. K., and Duchowski, A. T., "Use of Eye Movements as Feedforward Training for a Synthetic Aircraft Inspection Task", in Proceedings CHI '05, Apr. 2-7, 2005, Portland, OR, ACM. *[Received 1 of 20 nominations for best paper: top 5% of 371 papers submitted.]*

Vembar, D., Iyengar, N., Duchowski, A. T., Clark, K., Hewitt, J., Pauls, K., "Effect of visual cues on human performance in navigating through a virtual maze", in Eurographics Symposium on Virtual Environments, Jun. 8-9, 2004, Grenoble, France, EuroGraphics, pp. 53-60.

Sadasivan, S., Nalanagula, D., Greenstein, J. S., Duchowski, A. T., and Gramopadhye, A. K., "Training novice inspectors to adopt an expert's search strategy", in Proceedings of the Industrial Engineering Research Conference, May 15-19, 2004, Houston, TX, IIE.

Nalanagula, D., Sadasivan, S., Greenstein, J. S., Gramopadhye, A. K., and Duchowski, A. T., "Investigating feedforward training displays of visual inspection search strategy", in Proceedings of the Industrial Engineering Research Conference, May 15-19, 2004, Houston, TX, IIE.

Nalanagula, D., Sadasivan, S., Gramopadhye, A. K., Leonard, M., Duchowski, A. T., Vembar, D., Castle, C., and Washburn, C., "Using virtual reality to support education in aircraft maintenance technology", in Proceedings of the Aviation Technician Education Council (ATEC), May 15-19, 2004, Las Vegas, NV.

Duchowski, A. T., "Hardware-Accelerated Real-Time Simulation of Arbitrary Visual Fields (Poster)", in Eye Tracking Research & Applications (ETRA), Mar. 22-24, 2004, San Antonio, TX, ACM, pp. 59.

Duchowski, A. T., Cournia, N. A., Cumming, B., McCallum, D., Gramopadhye, A. K., Greenstein, J. S., Sadasivan, S., and Tyrrell, R. A., "Visual Deictic Reference in a Collaborative Virtual Environment", in Eye Tracking Research & Applications (ETRA), Mar. 22-24, 2004, San Antonio, TX, ACM, pp. 35-40.

Sadasivan, S., Nalanagula, D., Greenstein, J. S., Duchowski, A., Vembar, D., and Gramopadhye, A. K., "Technology to Improve Aviation Safety: Recent Efforts at Clemson University", in Proceedings of the Conference on Safety Across High Consequence Industries, Mar. 9-10, 2004. St. Louis, MO.

Sadasivan, S., Nalanagula, D., Greenstein, J. S., Gramopadhye, A. K. and Duchowski, A. T., "Evaluating Advanced Displays to Provide Search Strategy Information in a Virtual Reality Training Environment", in Proceedings of International Conference on Industrial Engineering Theory, Applications, and Practice, Nov. 10-12, 2003. Las Vegas, NV.

Desai, R. R., Gramopadhye, A. K., Melloy, B. J., and Duchowski, A. T., "Effect of Alternate Feedback Strategies on Performance for a Synthetic Aircraft Visual Inspection Task", in Proceedings of the Human Factors and Ergonomics Society, Oct. 10-17, 2003, Denver, CO, HFES.

Khasawneh, M. T., Kaewkuekool, S., Bowling, S. R., Desai, R., Jiang, X., Duchowski, A. T., and Gramopadhye, A. K., "The Effect of Eye Movements on Visual Inspection Performance", in Proceedings of the Industrial Engineering Research Conference, May 17-21, 2003, Portland, OR, IIE.

Cournia, N. A., Smith, J. D., Duchowski, A. T., "Gaze- vs. Hand-Based Pointing in Virtual Environments", in SIGCHI 2003 (Short Talks & Interactive Posters), Apr. 5-10, 2003, Ft. Lauderdale, FL, ACM.

Marmitt, G., Duchowski, A. T., "Modeling Visual Attention in VR: Measuring the Accuracy of Predicted Scanpaths", in *EuroGraphics 2002 (Short Presentations)*, Sep. 2-6, 2002, Saarbrücken, Germany, EuroGraphics.

Duchowski, A. T., Medlin, E., Cournia, N. A., Gramopadhye, A. K., Melloy, B. J. and Nair, S. N., "3D Eye Movement Analysis for VR Visual Inspection Training", in *Eye Tracking Research & Applications (ETRA)*, Mar. 25-27, 2002, New Orleans, LA, ACM, pp. 103-110, 155.

Duchowski, A. T., Medlin, E., Gramopadhye, A. K., Melloy, B. J., and Nair, S. N., "Binocular Eye Tracking in VR for Visual Inspection Training", in *Virtual Reality Software & Technology (VRST)*, Nov. 15-17, 2001, Banff, AB, Canada ACM, pp. 1-9.

Nair, S. N., Medlin, E., Vora, J., Gramopadhye, A. K., Duchowski, A. T., Melloy, B. J., Kanki, B., "Cognitive Feedback Training Using 3D Binocular Eye Tracker", in *Human Factors and Ergonomics Society Meeting 2001*, Oct. 8-12, 2001, Minneapolis, MN, HFES, pp. 1838-1842.

Vora, J., Nair, S. N., Medlin, E., Gramopadhye, A. K., Duchowski, A. T., Melloy, B. J., "Using Virtual Reality to Improve Aircraft Inspection Performance: Presence and Performance Measurement Studies", in *Human Factors and Ergonomics Society Meeting 2001*, Oct. 8-12, 2001, Minneapolis, MN, HFES, pp. 1867-1871.

Murphy, H. A., Duchowski, A. T., "Gaze-Contingent Level Of Detail Rendering", in *EuroGraphics 2001 (Short Presentations)*, Sep. 4-7, 2001, Manchester, UK, EuroGraphics.

Duchowski, A. T., Shivashankaraiah, V., Rawls, T., Gramopadhye, A. K., Melloy, B. J., Kanki, B., "Binocular Eye Tracking in Virtual Reality for Inspection Training", in *Eye Tracking Research & Applications (ETRA)*, Nov. 6-8, 2000, Palm Beach Gardens, FL, ACM, pp. 89-96, 146.

Danforth, R., Duchowski, A. T., Geist, R., and McAliley, E., "A Platform for Gaze-Contingent Virtual Environments", in *Smart Graphics Symposium*, Mar. 20-22, 2000, AAAI.

Robinson, M. B., Hamshar, J. A., Novillo, J. E., and Duchowski, A. T., "A Java-based Tool for Reasoning About Models of Computation Through Simulating Finite Automata and Turing Machines", in *Proceedings of the Special Interest Group on Computer Science Education (SIGCSE)'99*, Mar. 1999, ACM, New York, NY, pp. 105-109.

Conference Proceedings (Unreviewed)

Vembar, D., Sadasivan, S., Stringfellow, P. F., Duchowski A., "Gamepad vs. Keyboard: An Evaluation of Interaction Devices for NDI Training in VR", in *Proceedings of the International Ergonomics Association Conference*, Maastricht, Netherlands, Jul. 10-15, 2006.

Sadasivan, S., Stringfellow, P. F., Nalanagula, D., Castle, C., Washburn, C., Kanki, B., Duchowski, A., Leonard, M., and Gramopadhye, A. K., "Using Virtual Reality Technology to Support Aircraft Maintenance Training", in *Proceedings of the IMAGE Society Conference*, Scottsdale, AZ, Jul. 12-16, 2004.

Balk, S. A., Moore, K. S., Steele, J. E., Spearman, W. J., and Duchowski, A. T., "Mobile Phone Use in a Driving Simulation Task: Differences in Eye Movements" (poster), *Vision Sciences Society (VSS)*, Sarasota, FL, May 5-10, 2006.

Also appears as:

Balk, S. A., Moore, K. S., Steele, J. E., Spearman, W. J., & Duchowski, A. T. (2006). "Mobile Phone Use in a Driving Simulation Task: Differences in Eye Movements" (Abstract), *Journal of Vision*, 6(6), 872a.

Gramopadhye, A. K., Duchowski, A. T., Greenstein, J. S., Kaewkuekool, S., Khasawneh, M. T., Cournia, N. A., Bowling, S., "Technology the Equalizer: Can it be Used to Improve Novice Inspection Performance?", in *Proceedings of HCI International*, Crete, Greece, Jun. 22-27, 2003.

Duchowski, A. T., Marmitt, G., Desai, R., Gramopadhye, A. K., and Greenstein, J. S., "Algorithm for Comparison of 3D Scanpaths in Virtual Reality", *Vision Sciences Society (VSS)*, Sarasota, FL, May 9-14, 2003.

Kaewkuekool, S., Khasawneh, M. T., Bowling, S. R., Gramopadhye, A. K., Duchowski, A. T., and Melloy, B. J., "Using Virtual Reality to Support Feedback/Feedforward Training to Improve Human Performance" in *Proceedings of the Industrial Engineering Research Conference*, Orlando, FL, 2002.

Duchowski, A. T., "Eye Tracking Techniques for Perceptually Adaptive Graphics", in *SIGGRAPH 2001 Perceptually Adaptive Graphics Campfire*, Snowbird, UT, May 2001, ACM, New York, NY.

Master, R., Jian, X., Vora, J., Gramopadhye, A. K., Duchowski, A. T., Melloy, B. J., Watson, J., "Using Technology to Support Aircraft Inspection Training", in *Proceedings of the 12th International Symposium on Aviation Psychology*, Columbus, OH, Apr. 2001.

Duchowski, A. T., "3D Wavelet Analysis of Eye Movements", in *Wavelet Applications IV*, Apr. 1998, SPIE, Bellingham, WA.

Duchowski, A. T., "Representing Multiple Regions Of Interest with Wavelets", in *Visual Communications and Image Processing*, Jan. 1998, SPIE, Bellingham, WA.

Duchowski, A. T., and McCormick, B. H., "Gaze-Contingent Video Resolution Degradation", in *Human Vision and Electronic Imaging II*, Jan. 1998, SPIE, Bellingham, WA.

Duchowski, A. T., "Incorporating the Viewer's Point-Of-Regard (POR) in Gaze-Contingent Virtual Environments", in *The Engineering Reality of Virtual Reality*, Jan. 1998, SPIE, Bellingham, WA.

McCormick, B. H., Batte, D. A., and Duchowski, A. T., "A Virtual Environment: Exploring the Brain Forest", in *CENAC Conference*, Oct. 1996, Mexico City, Mexico.

Duchowski, A. T. and McCormick, B. H., "Modeling Visual Attention For Gaze-Contingent Video Processing", in *Ninth Image and Multidimensional Signal Processing (IMDSP) Workshop*, Mar. 3-6, 1996, Belize City, Belize, IEEE and IS&T, New York, NY, pp. 130-131.

Duchowski, A. T. and McCormick, B. H., "Simple Multiresolution Approach for Representing Multiple Regions of Interest (ROIs)", in *Visual Communications and Image Processing (VCIP)*, May 23-26, 1995, Taipei, Taiwan, SPIE (vol. 2501), Bellingham, WA, pp. 175-186.

Duchowski, A. T. and McCormick, B. H., "Pre-attentive Considerations for Gaze-Contingent Image Processing", in *Human Vision, Visual Processing, and Digital Display VI*, Feb. 6-8, 1995, San Jose, CA, SPIE (vol. 2411), Bellingham, WA, pp. 128-139.

Research Reports

Gramopadhye, A. K., Duchowski, A. T., Melloy, B. J., Khasawneh, M., Bowling, S., Kaewkuekool, S., Vora, J., Nair, S. N. and Meldin, E., "Virtual Reality Technology for Aircraft Visual Inspection: Training and Job Aiding", Final Technical Report, NASA Ames Research Center, 2002.

Vora, J. Nair, S. N., Medlin, E., Gramopadhye, A. K., Duchowski, A. T., Melloy, B. J., "Evaluating Virtual Reality Environment for Aircraft Visual Inspection: Presence and Comparison Studies", *Technical Report*, NASA Ames Research Center, May 2001.

Other Scholarly Publications

Ji, Q., Wechsler, H., Duchowski, A. T., and Flickner, M., (Editorial), Special Issue on Eye Detection and Tracking, *Computer Vision and Image Understanding*, 98(1), Apr. 2005.

Duchowski, A. T., Geisler, W. S., Baudisch, P., "Attentive Displays: Focus and Context", *Communications of the ACM*, 46(3), Mar. 003.

PRESENTATIONS

Alberts, A., Cutrell, E., and Duchowski, A. T., Augmenting Usability with Eye Movement Process Metrics: Hands-On Training, SIGCHI 2008 Course 14, Florence, Italy, Apr. 2008, ACM.

Duchowski, A. T., Modes and Transitions: Charting a Course for Creative Interaction, COGAIN 2007, Leicester, UK, Sep. 3-4, 2007 (keynote address).

Duchowski, A. T., Eye Tracking Methods and Applications @ Clemson: With Slight Emphasis on Interaction, University of Zurich Irchel, Department of Geography, Geographic Information Visualization & Analysis (GIVA) Division, Zurich, Switzerland, Jul. 23, 2007 (invited talk).

Duchowski, A. T., Usability: Mainstream Eye Tracking? Recent Developments, Outstanding Issues, and Future Directions, Tobii User Meeting, Frankfurt, Germany, Apr. 18-19, 2007 (keynote address).

Duchowski, A. T., Gaze-Contingent Displays: Review and Current Trends, Adaptive Displays Conference, Los Angeles, CA, Aug. 7, 2004 (invited talk).

Material for this presentation was published as the following journal paper:

Duchowski, A. T., Cournia, N. A., and Murphy, H. A., Gaze-Contingent Displays: A Review, *CyberPsychology and Behavior*, 7(6), 2004, Mary Ann Liebert, Inc.

Duchowski, A. T., Eye Movement in VR: Applications, Concerns, and Pitfalls, European Conference on Eye Movements (ECEM) 12, Dundee, Scotland, Aug. 20-24, 2003 (invited talk).

Duchowski, A. T., Attentive User Interfaces: Considering Attention in Display Design, Image Coding Group, Electrical Engineering Dept., Linköping University, Linköping, Sweden, Jun. 4, 2003 (invited talk).

Duchowski, A. T., Eye Movement Measurement in Virtual Reality: Diagnostic and Interactive Applications, Southern Society for Philosophy and Psychology (SSPP) Annual Meeting, Atlanta, GA, Apr. 17-19, 2003 (invited talk).

Murphy, H. A. and Duchowski, A. T., *Perceptual Gaze Extent & Level Of Detail in VR: Looking Outside the Box*, SIGGRAPH 2002 Conference Abstracts & Applications, San Antonio, TX, Jul. 2002, ACM.

Duchowski, A. T., *Eye Tracking Techniques in Virtual Reality*, Naval Research Laboratory, Washington, D.C., Jun. 2001 (invited talk).

Duchowski, A. T. and Vertegaal, R. *Eye-Based Interaction in Graphical Systems: Theory & Practice* SIGGRAPH 2000 Course 05, New Orleans, LA, Jul. 2000, ACM.

HONORS AND AWARDS

Faculty Collaboration Award (with Anand K. Gramopadhye), Clemson University College of Eng. and Science, 2008.

Early Promotion (Associate Professor), Clemson University, 2002.

Award for Faculty Excellence, Clemson University Board of Trustees, 2001.

Recognition of Service Award, ACM, 2000.

Faculty Early Career Development (CAREER) Award, NSF, 2000-2003.

SPONSORED RESEARCH

“CPATH EAE: TEXNH - Evaluation, Adoption and Extension”, National Science Foundation (NSF), CISE Pathways to Integrated Undergraduate Computing Education (CPATH) Program, Co-PI, with Westall, J. (PI), Wang, J., Davis, T., and Geist, R., \$453,673.00, (07/07-07/10).

“Virtual Simulated Inspection (ViSIns) Laboratory: Using Interactive 3D Knowledge Objects to Promote Learning for Non-Destructive Inspection in Aviation Maintenance Technology”, National Science Foundation (NSF) through Greenville Technical College, Division of Undergraduate Education (DUE), Co-PI, with Washburn, C. (PI), Kendall, W., Kurz, M., and Gramopadhye, A. K., \$269,962.00 (\$938,855.00 total), (06/07-06/10).

“Patient Room for the Future Prototype Research Initiative”, Department of Defense through Spartanburg Regional Health System, Co-PI, with Battisto, D. B. (PI), Pak, R., Allison, D., and Davis, T. A., and Blouin, V., \$363,678.00, (06/07-01/09).

“Assessing Sailor-System Interfaces of the Common Systems Functions Employed Within FORCENet Engagement Packs”, DoD/SPAWAR Charleston through Eagen, McAllister Associates, Inc., Subcontractor Award DO 0054-22 (Contract N65236-03-D-3830, Subcontract 00-3830-22), PI, \$20,000.00, (05/07-05/07).

“Usability Engineering in FORCENet”, DoD/SPAWAR Charleston through Eagen, McAllister Associates, Inc., Subcontractor Award DO 0054-22 (Contract N65236-03-D-3830, Subcontract 00-3830-22), PI, \$8,319.00, (09/06-09/06).

“Human Systems Integration Usability Lab Support”, DoD/SPAWAR Charleston through Eagen, McAllister Associates, Inc., Subcontractor Award DO 0054-22 (Contract N65236-03-D-3830, Subcontract 00-3830-22), PI, with Gugerty, L., Muth, E., and Tyrrell, R., \$115,528.00, (08/04-07/05).

“ATE: Integrating Asynchronous Technology and Virtual Reality to Support Education in Aircraft Maintenance Technology Education”, National Science Foundation (NSF) through Greenville Technical College, Advanced Technology Education (ATE) Program, Co-PI, with Castle, C. (PI), Gramopadhye, A. K., Leonard, M. S., and Washburn, C., \$389,655.00, (10/03-09/06).

“EI: TECHNI: A New Approach to the B.A. Degree in Computer Science”, National Science Foundation (NSF), Educational Initiative (EI) Program, Co-PI, with Davis, T. (PI), Westall, J., Kundert-Gibbs, J., and Geist, R., \$330,000.00, (06/03-05/06).

“REU Supplement-ITR: Visual Deictic Reference in a Collaborative Virtual Environment for Visual Search Training”, National Science Foundation (NSF), Information Technology Research (ITR) Program (Small), Grant IIS-0217600 (REU Supplement), PI, with Gramopadhye, A. K., and Greenstein, J. S., \$12,000.00, (10/02-09/03).

“ITR: Visual Deictic Reference in a Collaborative Virtual Environment for Visual Search Training”, National Science Foundation (NSF), Information Technology Research (ITR) Program (Small), Grant IIS-0217600, PI, with Gramopadhye, A. K. and Greenstein, J. S., \$313,361.00, (10/02-09/04).

“Using Advanced Displays to Support Training & Job-Aiding: Improving Aircraft Inspection”, NASA Ames, Human Factors Research and Technology Division, Co-PI, with Gramopadhye, A. K., and Melloy, B. J. (Co-PIs), \$472,816, (01/02-12/04).

“An Upgrade to Clemson’s Graphics-Supercomputer”, Clemson University Provost’s Office, Co-PI, with Geist, R. (PI), Dawson, D., Dooley, L., Edie, D., Latour, R., and Westall, M., \$115,000 (\$55,444 matching funds), (03/00-08/00).

“CAREER: Development of an Eye Tracking Education and Research Program at Clemson University”, National Science Foundation (NSF), Directorate for Computer Information Science and Engineering (CISE), Human Computer Interaction Program, Grant IIS-9984278, PI, \$298,786, (04/00-04/03).

“Virtual Reality Technology for Aircraft Visual Inspection: Training and Job-Aiding”, NASA Ames, Human Factors Research and Technology Division, Task #NCC 2-1114, Co-PI, with Gramopadhye, A. K., and Melloy, B. J. (Co-PIs), \$267,742, (02/99-01/01).

“Development of an Eye Tracking Methodology Course at Clemson”, Clemson University Innovation Fund, Project #1-20-1906-51-4087, PI, with Galluscio, G., Pury, C., Mittelstaedt, J., Carlson, L., Melloy, B. J., and Gramopadhye, A. K., \$39,860 (\$20,000 matching funds), (08/98-08/99).

“Exploring the Brain Forest”, Texas Advanced Technology Program, Project 999903-124, assisted in preparation, \$126,947 (\$39,710 matching funds), (01/96-12/97).

“Telecommunications in Virtual and Real Environments”, National Science Foundation (NSF), Directorate for Computer Information Science and Engineering (CISE), Research Instrumentation Grant CDA-9422123, assisted in preparation, \$101,232 (\$33,315 matching funds), (01/95-12/97).

OTHER SPONSORED ACTIVITY

Travel Mini-Grant, Office of Graduate Studies, Texas A&M University, (1995).

Travel Grant, International Student Services, Texas A&M University, (1995).

STUDENT ADVISING

Doctoral Graduates

Murphy, Hunter A. (PhD), Hybrid Image/Model Based Gaze-Contingent Rendering, Dec. 2007.

Cournia, Nathan A. (PhD), Penumbra Volumes For Real-Time Generation of Perceptually Correct Soft Shadows on Modern Graphics Hardware, Dec. 2006.

Masters Graduates

Ryan, Wayne J. (MS), LimbusTrack: Stable Eye-Tracking in Imperfect Light Conditions, May 2007.

Grinding, Thomas (MS), Eye Movement Analysis & Prediction with the Kalman Filter, Aug. 2006.

Heminghous, John (MS), iComp: A Scanpath Comparison Tool, May 2006.

Vembar, Deepak (MS), Towards Improved Behavioral Realism in Avatars, Dec. 2004.

Cumming, Brian (MS), Facilitating the Development of Maya File Translator Plug-ins Through Middleware, Dec. 2004.

Medlin, Eric (MS), Vergence Eye Movements in Virtual Reality, May 2003.

Marmitt, Gerd (MS), Modeling Visual Attention in VR: Measuring the Accuracy of Predicted Scanpaths May 2003.
Murphy, Hunter (MS), Nonisotropic Gaze-Contingent Geometric Level Of Detail Rendering Aug. 2001.
Shivashankaraiah, Vinay (MS), Multi-Threading a Binocular Eye Tracking Virtual Environment for Aircraft Inspection Training Aug. 2000.

Current Graduate Advising

Tonkin, Charles (PhD), Capturing Eye Movements over Physical Store Shelves (expected graduation: Aug. 2009).
Vembar, Deepak (PhD), Virtual Borescope Haptics (expected graduation: Aug. 2009).
Ryan, Wayne J. (PhD), Iris Segmentation for Recognition and Eye Tracking (expected graduation: Aug. 2009).

Graduate Research Assistant Support

Tomlinson, Josh (MS), Real-Time Avatar Modeling.

Undergraduate Honors Advisees

Borland, David, A Viewer/Reader/Writer for Alias|Wavefront OBJ, VDF, and VRML files (Dec. 2000).
Valdez, Jeffrey, Eye Movements and Attentional Bias in Anxiety, (May 2000).

Undergraduate Projects

Brannan, Paul, Virtual Reality System for Aircraft Inspection, (Dec. 2000).
Rawls, Timothy, Virtual Reality System for Aircraft Inspection, (Dec. 1999).
McCallum, Daniel, Collaborative Virtual Environments.

TEACHING

Courses Taught (Beginning Spring 1998; semester in ()'s indicates introduction of newly developed course)
CPSC 212, Computer Science IV (Data Structures & Algorithms, Techni Track), (F06)
CPSC 215, Tools and Techniques for Software Development (C/C++ Programming in the Unix Environment), (S01)
CPSC 241, Computer Science IV (Data Structures & Algorithms), F98
CPSC 405/605, Introduction to Computer Graphics, S99-S02, S04, S06
CPSC 412/612, Eye Tracking Methodology, (F99), F00-F08
CPSC 414/614, Human Computer Interaction, (S02)-S07
CPSC 481/681, 3D Game Programming, (S05)
CPSC 805, Advanced Computer Graphics, S98, S99, S03, S08
CPSC 808, Computer Animation, (S00)
CPSC 815, Special Effects Production, (F99)-F03
CPSC 951, Seminar, SS02

UNIVERSITY AND PUBLIC SERVICE

Continuing Education

"Eye Tracking Research & Applications Symposium", Co-Founder and General Chair, 2000, 2002, 2004, 2006, 2008.

"Augmenting Usability with Eye Movement Process Metrics: Hands-On Training", Course co-organizer and lecturer, (with Ed Cutrell and Amy Alberts), SIGCHI 2008 Course 14, Florence, Italy, Apr. 2008, ACM.

"Eye-Based Interaction in Graphical Systems: Theory & Practice", Course co-organizer and co-lecturer (with Roel Vertegaal), SIGGRAPH 2000 Course 05, New Orleans, LA, Jul. 2000, ACM.

Committees

Member, College of Engineering and Science Dean's Advisory Council (2002–2003)
Member, Computer Science Department Faculty Search Committee (2001–)
Elected Member, Computer Science Department Advisory Committee (1999–)

Other Service

Faculty Advisor, Dixie Skydivers (Clemson University sports club) (1999–2001)

MISCELLANEOUS

Personal Development

Completion of 4-day course on the use of Apple Shake, a digital special effects compositing tool, Sep. 2002.
Attendance at 2-day workshop for DoD proposal writers, Jul. 2002.
Completion of 4-day course on the use of Maya Composer, a digital special effects compositing tool, Aug. 2000.