NICHOLAS A. GIUDICE, PhD

CURRICULUM VITA

University of Maine
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EDUCATION AND TRAINING

2005–2008	Postdoctoral Fellow, Psychology: Cognition, Perception, and Cognitive Neuroscience Program Sponsor: Prof. Jack M. Loomis University of California, Santa Barbara (UCSB)
1998–2004	Ph.D., Psychology: Cognitive and Biological Program Advisors: Prof. Gordon E. Legge and Prof. Herbert L. Pick University of Minnesota, Twin Cities (UMN)
1993–1997	B.A., (Magna Cum Laude), Psychology and Philosophy Providence College (PC)

POSITIONS AND AFFILIATIONS

Professional Positions

2008–Present Assistant Professor, Department of Spatial Information Science and Engineering (SIE), University of Maine (UMaine)

2008–Present Director, Virtual Environment and Multimodal Interaction Laboratory (VEMI Lab), UMaine

2007–Present Human Factors Engineer, Kinnexxus Inc., Los Altos, CA

Cooperative Appointments

2009–Present Department of Psychology, UMaine

2008–Present National Center for Geographic Information and Analysis (NCGIA), UMaine

RESEARCH INTERESTS

Multimodal Spatial Cognition: Comparing spatial learning, updating, and wayfinding behavior within and between modalities (3-D sound, touch, vision, and spatial language).
Functional Equivalence of Spatial Representations: Researching whether modality-specific encoding leads to amodal representations in memory equally accessible to supporting action.
Environmental Learning With and Without Vision: Developing multimodal displays to support seamless navigation of indoor and outdoor environments (real and virtual).
Neurocognitive Engineering: Combining perceptual, cognitive neuroscientific, and human factors principles for theoretically motivated interface design

COMPETITIVE GRANTS AND RESEARCH SUPPORT

2009–2012	NSF technology supplement CDI-0936008 (PI)
2009–2012	NSF grant IIS-0916219, researching formal models and user interactions for navigating indoor/outdoor spaces (Co-PI, with M. Worboys, UMaine PI)
2009–2011	NIH grant R01-EY016817, researching functional equivalence and amodal spatial images (UMaine PI, with J.M. Loomis, UCSB (PI), and R.L. Klatzky, CMU)
2009–2011	NIH grant EY017228-02A2, researching accessible indoor GPS technology for the blind (UMaine PI, with Koronis Biomedical Technologies (PI), Minneapolis, MN)
2008–2012	Collaborative NSF grant CDI-0835689, researching a non-visual indoor navigation system (UMaine PI, with K. Daniilidis, UPenn (PI), S. Roumeliotis, UMN, and R. Manduchi, UCSC)
2008–2009	NSF grant BCS-0745328, researching functional equivalence and amodal spatial images (UMaine PI, with J.M. Loomis, UCSB (PI), and R.L. Klatzky, CMU)
2008	Brain Imaging Center, seed funding for neuroimaging project (Co-PI with J.M. Loomis and T. Wolbers, UCSB)
2005–2008	NIH postdoctoral NRSA grant EY-015963, researching multimodal spatial cognition (PI)
2001–2004	Visual Neuroscience pre-doctoral training grant 5T32-EY07133 (Graduate Trainee)
2002–2003	NIH grant F32-EY015963-01 (Graduate Research Assistant)
2002–2007	Multi-institution NIDRR grant H133A011903, researching indoor/outdoor wayfinding technologies for the blind (Graduate Research Assistant and Collaborator)
2002	Center for Cognitive Sciences mini-research grant (Graduate Trainee)
2001	NIH Center for Cognitive Sciences fellowship T32-HD07151 (Graduate Trainee)
1998–2000	NSF Vision and Motor Control fellowship GER-9454163 (Graduate Trainee)
1998	UMN graduate school fellowship (Graduate Trainee)

PUBLICATIONS

Peer-Reviewed Journal Articles

Giudice, N.A., Bakdash, J.Z., Legge, G.E., & Roy, R. (in press). Spatial learning and navigation using a virtual verbal display. *ACM Transactions on Applied Perception*.

Giudice, N. A., Klatzky, R. L., & Loomis, J. M. (2009). Evidence for amodal representations after bimodal learning: Integration of haptic-visual layouts into a common spatial image. *Spatial Cognition & Computation*, 9(4), 287-304.

Kalia, A., Legge, G.E., & Giudice, N.A. (2008). Learning building layouts with non-geometric visual information: The effects of visual impairment and age. *Perception*, 37(11), 1677-1699.

Klatzky, R.L., Marston, J.R., Giudice, N.A., Tietz, J., Golledge, R.G., & Loomis, J.M. (2008). An n-back task using vibrotactile stimulation with comparison to an auditory analogue. *Behavior Research Methods*, 40(1), 367-372.

Giudice, N.A., Bakdash, J.Z., & Legge, G.E. (2007). Wayfinding with words: Spatial learning and navigation using dynamically-updated verbal descriptions. *Psychological Research*, 71(3), 347-358.

Klatzky, R.L., Marston, J.R., Giudice, N.A., Golledge, R.G., & Loomis, J.M. (2006). Cognitive load of navigating without vision when guided by virtual sound versus spatial language. *Journal of Experimental Psychology: Applied*, 12(4), 223-232.

Peer Reviewed Book Chapters and Conference Proceedings

Long, R.G., & Giudice, N.A. (in press). Orientation and wayfinding. In B.B. Blasch, W.R. Wiener, & R.W. Welsh (Eds.), *Foundations of Orientation and Mobility*, 3rd Edition. New York: American Foundation for the Blind.

Giudice, N.A., & Tietz, J. (2008). Learning with virtual verbal displays: Effects of interface fidelity on cognitive map development. In C. Freksa, N. Newcombe, P. Gärdenfors, & S. Wölfl (Eds.), *Spatial Cognition VI: Lecture Notes in Artificial Intelligence* (Vol. 5248, pp. 121-137). Berlin: Springer.

Giudice, N.A., & Legge, G.E. (2008). Blind navigation and the role of technology. In A. Helal, M. Mokhtari, & B. Abdulrazak (Eds.), *Engineering Handbook of Smart Technology for Aging, Disability, and Independence* (pp. 479-500).: John Wiley & Sons.

Submitted Manuscripts

Giudice, N.A., Betty, M.R., & Loomis, J.M. (in revision). Functional equivalence of spatial images from touch and vision: Evidence from spatial updating in blind and sighted individuals.

Wolbers, T., Zahorik, P., & Giudice, N. A. (submitted). Predicting the direction of auditory motion from hMT+ activity in blind humans.

Giudice, N.A., McHugh, B., & Miyanohara, M. (submitted). Haptic map learning: Effects of display orientation on the acquisition and transfer of spatial knowledge.

Unpublished Works

Giudice, N. A. (1999). Advances in personal navigation systems for the blind: A review and proposal for tomorrow's technology. *Unpublished whitepaper.* UMN.

Giudice, N.A. (December 2004). Navigating novel environments: A comparison of verbal and visual learning. *Unpublished doctoral dissertation.* UMN.

Conference Presentations

Giudice, N. A., Wutte, M., Klatzky, R. L., Loomis, J. M., & Wolbers, T. (2009). Modality independent coding of 3d layout: fMRI evidence for PPA involvement of haptic and visual scenes by sighted and blind participants, *50th Annual Psychonomics Society Meeting*. Boston, MA.

Giudice, N.A. (2008). Learning with virtual verbal displays: Effects of interface fidelity on cognitive map development. *Spatial Cognition 2008 Conference*, September, Freiburg, Germany.

Riehle, T.H., Lichter, P., & Giudice, N.A. (2008). An indoor navigation system to support the visually impaired. *30th Annual IEEE Engineering in Medicine and Biology Conference*, August, Vancouver, Canada.

Giudice, N.A., Marston, J.R., Klatzky, R.L., Loomis, J.M., & Golledge, R.G. (2008). Environmental learning without vision: Effects of cognitive load on interface design. *Vision 2008* – The 9th International Conference on Low Vision, July, Montreal, Canada.

Marston, J.R., Klatzky, R.L., Giudice, N.A., Loomis, J.M., & Golledge R.G. (2007). Measuring cognitive load of non-visual navigation interfaces. *Association of American Geographers* (AAG) 104th Annual Meeting, April, San Francisco, CA.

May, M., Giudice, N.A., LaPierre, C., & Ponchillia, P. (2007). Results from 5-year NIDRR wayfinding grant and future prospects. *22nd Annual CSUN International Conference, Technology and Persons with Disabilities*, March, Los Angeles, CA.

Giudice, N.A., Betty, M.R., & Loomis, J.M. (2006). Orientation specificity with vision and touch: Map learning, haptic updating, and functional equivalence. *Journal of Vision*, 6(6), 178a.

Kalia, A., Legge, G.E., & Giudice, N.A. (2006). Learning virtual building layouts: The effects of age on the usefulness of geometric and nongeometric visual information. *Journal of Vision*, 6(6), 140a.

Giudice, N.A. (2006). Wayfinding without vision: Learning real and virtual environments using dynamically-updated verbal descriptions. *Conference on Assistive Technologies for Vision and Hearing Impairment*, July, Kufstein, Austria.

Tjan, B.S., Beckmann, P.J., Roy, R., Giudice, N.A., & Legge, G.E. (2005). Digital sign system for indoor wayfinding for the visually impaired*. Proceedings of the first IEEE workshop on computer vision applications for the visually impaired*, in conjunction with CVPR 2005, San Diego, CA.

Kalia, A., Giudice, N.A., & Legge, G.E. (2005). Learning building layouts with low vision: Do realistic details help or hinder? *Vision 2005* Conference, April, London, UK.

Kalia, A., Giudice, N.A., & Legge, G.E. (2004). Learning building layouts: The effects of visual information on developing global knowledge*. Object Perception, Attention, and Memory Conference*, November, Minneapolis, MN.

Giudice, N.A. & Legge, G.E. (2004). Comparing verbal and visual information displays for learning building layouts. *Journal of Vision*, 4(8), 889a.

Giudice, N.A., Legge, G.E., & Bakdash, J.Z. (2003). Navigating without vision: A role for spatial language? *Journal of Vision*, 3(9), 489a.

Legge, G.E., Mason, S.J., Brady, M., Giudice, N.A., & Schlicht, E.J. (2003). Maplets: Local geometrical components of human cognitive maps. Journal of Vision, 3(9), 136a.

Giudice, N.A. (2002). Tactile vision: Brain-reorganization in the blind: Implications for learning and adaptive technology. *Seventeenth Annual CSUN International Conference on Technology and Persons with Disabilities*, March, Los Angeles, CA.

Giudice, N.A., Mason, S.J., & Legge, G.E. (2002). The relation of vision and touch: Spatial learning of small-scale layouts. Journal of Vision, 2(7), 522a.

Schlicht, E.J., Legge, G.E., Stankiewicz, B.J., & Giudice, N.A. (2001). Are visual landmarks necessary for effective transfer of navigational knowledge between real and virtual buildings? *Annual Meeting of the Association of Research in Vision and Ophthalmology*, Fort Lauderdale, FL.

Giudice, N.A., Madison, C.M., Zhuang, J.C., Costello, P.A., Legge, G.E., Hu, X., & He, S. (2000). Tactile vision in the blind: An fMRI experiment on pattern recognition and brain plasticity. *Annual Meeting of the Association for Research in Vision and Ophthalmology*, Supp. IOVS, 40, S49, Fort Lauderdale, FL.

Bruggeman, H., Giudice, N.A., Stankiewicz, B.J., & Legge, G.E. (2000). Distal target localization by the blind. *Annual Meeting of the Association for Research in Vision and Ophthalmology*, Supp. IOVS, 40, S431, Fort Lauderdale, FL.

INVITED LECTURES AND OTHER COLLABORATIONS
(Presentations Delivered By First Author)

Giudice, N.A. (November 2009) Multimodal processing of spatial information: The intersection of spatial cognition and Neurocognitive Engineering, Institute for Research in Cognitive Science, UPenn.

Giudice, N.A. (July, 2009). A year with Giudice: Research, development, and future directions. The Minnesota Laboratory for Low-Vision Research, UMN.

Giudice, N.A. (April, 2009). Spatial learning from different sensory modalities: The intersection of experimental psychology and neurocognitive engineering. UMaine Psychology Colloquium, Orono, ME.

Marston, J.R., Golledge, R.G., Loomis, J.M., Klatzky, R.L., & Giudice, N.A. (April, 2008). Accessible and portable navigation devices for the blind: Interface options. Atlanta Center for the Visually Impaired and Georgia Institute of Technology, Atlanta, GA.

Marston, J.R., Golledge, R.G., Loomis, J.M., Klatzky, R.L., & Giudice, N.A. (April, 2008). Substituting for vision: Field experiments with several orientation and navigation devices. Atlanta VA Rehabilitation Research and Development Center of Excellence in Vision Loss, Atlanta, GA.

Loomis, J.M., Golledge, R.G., Klatzky, R.L., Marston, J.R., & Giudice, N.A. (April, 2008). Twenty years of research on the Personal Guidance System: What did we learn? ThinkSpatial Forum on Spatial Thinking, UCSB, CA.

Giudice, N.A. (February, 2008). Spatial learning in real and virtual environments: Navigation, cognitive mapping, and the development of multimodal displays . Department of Psychology, Wichita State University, KS.

Giudice, N.A. (February, 2008). Multimodal learning: When different spatial displays lead to the same spatial behavior. Department of Geography, University of Oregon, Eugene, OR.

Giudice, N.A. (December, 2007). Spatial Learning in Real and Virtual Environments: Development of Mental Representations using Multimodal Displays. Department of Spatial Information Science and Engineering, UMaine.

Giudice, N.A. (June, 2006). What's going on in GiudiceLand: Research past, present, and future. The Minnesota Laboratory for Low-Vision Research, UMN.

Giudice, N.A. (May, 2006). Orientation specificity with vision and touch: Map learning, haptic updating, and functional equivalence. Cognition, Perception, & Cognitive Neuroscience Colloquium, UCSB, CA.

Giudice, N.A. (April, 2005). Wayfinding with words: The use of spatial language for navigating real and virtual environments. Cognitive and Perceptual Sciences Colloquium, UCSB, CA.

Legge, G.E., Beckmann, P.J., Giudice, N.A., Kalia, A., Roy, R., & Tjan, B.S. (April, 2005). Wayfinding in buildings with vision impairment: Research and adaptive technology. Vision 2005 Conference, London, UK.

Giudice, N.A. (March, 2004). NIH: National Eye Institute, Scientific workshop on blindness, brain plasticity, and spatial function. Invited participant, Vanderbilt University, Nashville, TN.

Giudice, N.A. (October, 2002). Universal design, adaptive technology, and integration. Usability Professionals Association (UPA), Minneapolis, MN.

Giudice, N.A. (January, 2000). The relation of vision and touch in an angle estimation and production task. Vision Science Colloquium, UMN.

CONSULTING AND ADVISORY

2008–Present Consultant for Advanced Medical Electronics Corporation on technology for blind/low-vision information access for SBIR Phase I funding

2008–2011 Advisory board for NIH grant 9R44AG033522-02 on indoor navigation (PI: G.E. Legge, UMN, and Advanced Medical Electronics Corporation, Minneapolis, MN)

2007–Present Consultant for Koronis Biomedical Technologies on blind/low-vision navigation for SBIR Phase I and Phase II funding

2007–Present Advisory board for Kinnexxus Inc., factors affecting age-related vision loss for gerontechnology start-up company, Los Altos, CA

2006–2007 Efficacy testing of Touch Graphics Talking Tactile Tablet for multimodal navigation research (www.touchgraphics.com)

2003–2006 Usability testing during several Beta cycles with Sendero Group's accessible GPS navigation system (www.senderogroup.com)

STUDENT ADVISING AND MENTORING

2008–Present M.S. Thesis research advising
Kate Cuddy, indoor navigation technology

1998–Present Undergraduate research advising
Supervised 2-4 research assistants per year

GRADUATE COMMITTEE PARTICIPATION

Masters Committees:

Kate Cuddy, SIE, UMaine (chair)

Richard Corey, Intermedia, UMaine (member)

Timothy Garay, Physics, UMaine (member)

TEACHING

Spring 2010 Graduate Seminar, UMaine

Spring (09,10) Human-computer interaction, UMaine

Fall 2009 Virtual environment technology and research, UMaine

Spring (01,03) Perceptual correlates of low vision, co-taught, UMN

Spring (01,03) Vision laboratory, UMN

Fall 2002 Honors seminar: Navigation and spatial development, co-taught, UMN

Fall 2000 Human–machine interaction, teaching assistant, UMN

HONORS AND AWARDS

2009 UMaine F&A recovery award

2000–2003 Recipient of the UMN's Center for Cognitive Sciences James J. Jenkins Award for outstanding contributions to the center

2000 American Foundation for the Blind Award for academic excellence

1998 American Foundation for the Blind Award for excellent research potential

1998 American Council of the Blind Award for work in vision sciences

1998 NSF facilitation award for scientists & engineers with disabilities

1997 Inducted into Psychology Honors Society - Psi Chi

1997 Inducted into Philosophy Honors Society - Phi Sigma Tau

PROFESSIONAL SERVICE AND LEADERSHIP

2010–Present Faculty Representative, President's Council on Disabilities, UMaine

2009–Present Faculty Representative, Academic Excellence Committee, UMaine

2009 (Jan)	General Chair, workshop on virtual environment technology, UMaine
2008–Present	Faculty Representative, Accessible Information Committee, UMaine
2006–2008	Coordinator, monthly interdisciplinary spatial cognition research meeting, UCSB
2006 (July)	Session Chair, Conference on Assistive Technologies for People with Vision and Hearing Impairments, Kufstein, Austria
2003–2004	Student Representative, Center for Cognitive Sciences Governing Council, UMN
2000–2003	Chair, Center for Cognitive Sciences external colloquium series, UMN
2001–2002	Chair, bi-weekly colloquium of vision science lectures, UMN
1999–2000	Editorial Board, Center for Cognitive Science's Millennium Project, UMN
1994–1997	Presidential Appointee, ADA Advisory Committee, Providence College, Providence RI
1996–1997	Vice Chair, Legislative Affairs Committee, Providence College, Providence RI
1995–1996	Student Representative, Curriculum Review Committee for Providence College Accreditation Standards
1993–1997	Student Congress Representative, Junior Class Vice President, Providence College, Providence RI
1993–1997	Dean's List, Providence College, Providence RI

PROFESSIONAL MEMBERSHIPS

2010–Present	Learning Circle on Universal Design
2009–Present	Full Member, Psychonomics Society
2009–Present	Learning Science Special Interest Group
2009–Present	Delegate, University Consortium for Geographic Information Science
2002–2006	Member, The Vision Sciences Society

EDITORIAL SERVICE

Ad hoc journal reviewer: ACM Transactions on Applied Perception; ACM SIGCHI; Cognition; Cognitive Processing; IEEE Transactions on Systems, Man, and Cybernetics; Journal of Experimental Psychology- Learning, Memory, and Cognition; Memory and Cognition; Perception; Perception and Psychophysics; Spatial Cognition and Computation; UAIS; and Visual Impairment Research.

External grant reviewer: 2009 NSF BCS proposal; 2008 Netherlands Organization for Health Research and Development Grant for In-sight, ZonMw, Netherlands; and 2005 Ophthalmic Research Grant by the Institute of Ophthalmology, UCL, UK.

Book Reviewer: 2008 MIT Press , Cambridge, MA.

COMMUNITY SERVICE

2007–2008	Member of the Access Advisory Committee for the City of Santa Barbara, CA

2007 Volunteer computer instructor, Braille Institute, Santa Barbara, CA

NEWS AND PUBLIC RELATIONS

2009 (Oct) VEMI Lab featured in news article for the UMaine College of Engineering Magazine.

2009 (April) Featured on the Economic Report, (CNN & Discovery), as part of a news piece on the Maine-based company Intelligent Spatial Technologies

2007 (April) *The boy who sees with sound*.
Helped design and run experiments during filming of this BBC and Discovery channel documentary on echolocation.

2007 (March) *Checking the coordinates.*
Interviewed for Op-Ed piece on the connection between psychology and geography by R. Adelson (March 2007): APA Monitor on Psychology, 38(3), 16.

REFERENCES AND REPRINTS AVAILABLE ON REQUEST