

ROBERT HUBAL

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Education

S.B., Computer Science & Engineering
Massachusetts Institute of Technology, Cambridge, MA, 1983-1987

M.S., Computer Science
North Carolina State University, Raleigh, NC, 1990-1992

Ph.D., Cognitive Psychology
Duke University, Durham, NC, 1992-1996

Professional Experience

Senior Technical Consultant
Andersen Consulting, New York, NY, 1987-1990

Senior Research Psychologist
RTI International, Research Triangle Park, NC, 1996-2012

Lead Scientist
Soar Technology, Ann Arbor, MI, 2012-2016

Research Associate Professor
UNC Eshelman School of Pharmacy, Chapel Hill, NC, 2016-date

Publications

Journals

Sugarman, J., McCrory, D.C., & HUBAL, R.C. (1998). Getting meaningful informed consent from older adults: A structured literature review of empirical research. *Journal of the American Geriatrics Society*, 46(4), 517-524. [[pmid](#)]

Paschall, M.J., Fishbein, D.H., HUBAL, R.C., & Eldreth, D. (2005). Psychometric properties of virtual reality vignette performance measures: A novel approach for assessing adolescents' social competency skills. *Health Education Research: Theory and Practice*, 20(1), 61-70. [[pmid](#)]

Fishbein, D.H., Herman-Stahl, M., Eldreth, D.L., Paschall, M.J., Hyde, C., HUBAL, R., Hubbard, S., Williams, J., & Ialongo, N. (2006). Mediators of the stress-substance use relationship in high-risk urban adolescents. *Prevention Science*, 7(2), 113-126. [[pmid](#)]

Fishbein, D.H., Hyde, C., Eldreth, D., Paschall, M.J., HUBAL, R., Das, A., Tarter, R., Ialongo, N., Hubbard, S., & Yung, B. (2006). Neurocognitive skills moderate urban male adolescents' responses to preventive intervention materials. *Drug and Alcohol Dependence*, 82(1), 47-60. [[pmid](#)]

HUBAL, R.C., & Day, R.S. (2006). Informed consent procedures: An experimental test using a virtual character in a dialog systems training application. *Journal of Biomedical Informatics*, 39(5), 532-540. [[pmid](#)]

Link, M.W., Armsby, P.P., HUBAL, R.C., & Guinn, C.I. (2006). Accessibility and acceptance of responsive virtual human technology as a survey interviewer training tool. *Computers in Human Behavior*, 22(3), 412-426. [[doi](#)]

HUBAL, R. (2008). Embodied tutors for interaction skills simulation training. *International Journal of Virtual Reality*, 7(1), 1-8. [[doi](#)]

HUBAL, R.C., Evens, N.R., FitzGerald, D.P., Hardy, K.K., Willard, V.W., & Bonner, M.J. (2008). Implementation of FACS for synthetic characters for use in studying facial expression recognition by survivors of childhood cancer. *Annual Review of Cybertherapy and Telemedicine*, 6, 35-40.

HUBAL, R.C., Fishbein, D.H., Sheppard, M.S, Paschall, M.J., Eldreth, D.L., & Hyde, C.T. (2008). How do varied populations interact with embodied conversational agents? Findings from inner-city adolescents and prisoners. *Computers in Human Behavior*, 24(3), 1104-1138. [[pmid](#)]

Fishbein, D.H., Sheppard, M.E., Hyde, C., HUBAL, R.C., Newlin, D.B., Serin, R., Chrousos, G., & Alesci, S. (2009). Deficits in behavioral inhibition predict treatment engagement in prison inmates. *Law and Human Behavior*, 33(5), 419-435. [[pmid](#)]

Hourani, L.L., Council, C.L., HUBAL, R.C., & Strange, L.B. (2011). Approaches to the primary prevention of posttraumatic stress disorder in the military: A review of the stress control literature. *Military Medicine*, 176(7), 721-730. [[pmid](#)]

Publications, cont'd.

Hourani, L.L., Kizakevich, P.N., HUBAL, R., Spira, J., Strange, L.B., Holiday, D.B., Bryant, S., & McLean, A.N. (2011). Predeployment stress inoculation training for primary prevention of combat-related stress disorders. *Journal of CyberTherapy & Rehabilitation*, 4(1), 101-116.

HUBAL, R.C., Bonner, M.J., Hardy, K.K., FitzGerald, D.P., Willard, V.W., & Allen, T.M. (2011). Technical aspects and testing of a program to assess deficits in facial expression recognition in childhood cancer survivors. *Journal of CyberTherapy & Rehabilitation*, 4(3), 363-369.

HUBAL, R., & Pina, J. (2012). Serious assessments in serious games. *International Journal of Gaming and Computer-Mediated Simulations*, 4(3), 49-64. [[doi](#)]

HUBAL, R., van Lent, M., Wender, J., Lande, B., Flanagan, S., & Quinn, S. (2015). What does it take to train a good stranger. *Procedia Manufacturing*, 3, 3955-3962. [[doi](#)]

Hourani, L.L., Tueller, S.J., Kizakevich, P.N., Lewis, G., Strange, L.B., Weimer, B.J., Bryant, S.P., Bishop, E., HUBAL, R.C., & Spira, J.L. (in press). Toward preventing posttraumatic stress disorder: Development and testing of a stress inoculation program. *Military Medicine*.

Publications, cont'd.

Selected Peer-Reviewed Book Series & Book Chapters

HUBAL, R.C., Kizakevich, P.N., Guinn, C.I., Merino, K.D., & West, S.L. (2000). The virtual standardized patient—Simulated patient-practitioner dialogue for patient interview training. *Studies in Health Technology and Informatics*, 70, 133-138. [[pmid](#)]

Armsby, P.P., Link, M.W., HUBAL, R., Guinn, C.I., Flicker, L., & Caspar, R. (2003). Accessibility and acceptance of a virtual respondent-based interviewer training application. In R. Banks, J. Currall, J. Francis, L. Gerrard, R. Khan, T. Macer, M. Rigg, E. Ross, S. Taylor, & A. Westlake (Eds.), *Survey and Statistical Computing IV. The Impact of Technology on the Survey Process* (pp. 43-54). Association for Survey Computing.

HUBAL, R.C., Deterding, R.R., Frank, G.A., Schwetzke, H.F., & Kizakevich, P.N. (2003). Lessons learned in modeling virtual pediatric patients. *Studies in Health Technology and Informatics*, 94, 127-130. [[pmid](#)]

Deterding, R., Milliron, C., & HUBAL, R. (2005). The virtual pediatric standardized patient application: Formative evaluation findings. *Studies in Health Technology and Informatics*, 111, 105-107. [[pmid](#)]

Eriksson, E.J., Rodman, R.D., & HUBAL, R.C. (2007). Emotions in speech: Juristic implications. In C. Müller (Ed.), *Speaker Classification I: Fundamentals, Features, and Methods* (pp. 152-173). Springer-Verlag. [[doi](#)]

HUBAL, R., Kizakevich, P., & Furberg, R. (2007). Synthetic characters in health-related applications. *Studies in Computational Intelligence*, 65, 5-26. [[doi](#)]

Kizakevich, P.N., Culwell, A., Furberg, R., Gemeinhardt, D., Grantlin, S., HUBAL, R., Stafford, A., & Dombroski, R.T. (2007). Virtual simulation-enhanced triage training for Iraqi medical personnel. *Studies in Health Technology and Informatics*, 125, 223-228. [[pmid](#)]

Kizakevich, P.N., HUBAL, R., Brown, J., Lyden, J., Spira, J., Eckhoff, R., Zhang, Y., Bryant, S., & Munoz, G. (2012). PHIT for Duty, a mobile approach for psychological health intervention. *Studies in Health Technology and Informatics*, 181, 268-272. [[pmid](#)]

HUBAL, R., & Parsons, T. (in preparation). Synthetic environments for skills training and practice. In L. Lin & J.M. Spector (Eds.), *Constructive Articulation between the Learning Sciences and the Instructional Design and Technology Communities*. Routledge.

Publications, cont'd.

Selected Conference Proceedings

HUBAL, R.C., Helms, R.F., & Triplett, S.E. (1997). Advanced learning environments. In Proceedings of the Industry/Interservice Training Systems and Education Conference (pp. 79-86). NDIA.

Maggart, L.E., & HUBAL, R.C. (1998). A situation awareness model. In S.E. Graham & M.D. Matthews (Eds.), *Infantry Situation Awareness: Papers from the 1998 Infantry Situation Awareness Workshop* (pp. 19-28). U.S. Army Research Institute.

HUBAL, R.C., Frank, G.A., & Guinn, C.I. (2000). AVATALK virtual humans for training with computer generated forces. In Proceedings of the Conference on Computer Generated Forces (pp. 617-623). Institute for Simulation & Training.

HUBAL, R.C., & Frank, G.A. (2001). Interactive training applications using responsive virtual human technology. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 1076-1086). NDIA.

Mills, K.C., & HUBAL, R.C. (2001). Correlational data that support a constructive assessment of driving skills. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 435-446). NDIA.

Frank, G., Guinn, C., HUBAL, R., Pope, P., Stanford, M., & Lamm-Weisel, D. (2002). JUST-TALK: An application of responsive virtual human technology. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 773-779). NDIA.

Guinn, C., & HUBAL, R. (2003). Extracting emotional information from the text of spoken dialog. In Proceedings of the Workshop on Assessing and Adapting to User Attitudes and Affect: Why, When and How? User Modeling, Inc. [\[doi\]](#)

HUBAL, R.C., Frank, G.A., & Guinn, C.I. (2003). Lessons learned in modeling schizophrenic and depressed responsive virtual humans for training. In Proceedings of the Intelligent User Interface Conference (pp. 85-92). ACM Press. [\[doi\]](#)

Mills, K.C., HUBAL, R.C., & Ward, B.T. (2003). The relationship between collision history and a computerized assessment of visual and cognitive skills in a sample of school bus drivers. In Proceedings of the International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design (pp. 251-257). Human Factors & Vehicle Safety Research Program Public Policy Center.

Frank, G., Whiteford, B., HUBAL, R., Sonker, P., Perkins, K., Arnold, P., Presley, T., Jones, R., & Meeds, H. (2004). Performance assessment for distributed learning using after action review reports generated by simulations. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 808-817). NDIA.

Guinn, C., & HUBAL, R. (2004). An evaluation of virtual human technology in informational kiosks. In Proceedings of the International Conference on Multimodal Interfaces (pp. 297-302). ACM Press.

Publications, cont'd.

Guinn, C., HUBAL, R., Frank, G., Schwetzke, H., Zimmer, J., Backus, S., Deterding, R., Link, M., Armsby, P., Caspar, R., Flicker, L., Visscher, W., Meehan, A., & Zelon, H. (2004). Usability and acceptability studies of conversational virtual human technology. In Proceedings of the SIGdial Workshop on Discourse and Dialogue (pp. 1-8). Association for Computational Linguistics.

HUBAL, R., Frank, G., Guinn, C., & Dupont, R. (2004). Integrating a crisis stages model into a simulation for training law enforcement officers to manage encounters with the mentally ill. In Proceedings of the Workshop on Architectures for Modeling Emotion: Cross-Disciplinary Foundations, AAAI Spring Symposium Series (pp. 68-69). ACM Press.

HUBAL, R.C., Fishbein, D.H., & Paschall, M.J. (2004). Lessons learned using responsive virtual humans for assessing interaction skills. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 989-999). NDIA.

HUBAL, R.C., Guinn, C.I., Sparrow, D.C., Studer, E.J., Day, R.S., & Visscher, W.A. (2004). A synthetic character application for informed consent. In Proceedings of the Workshop on Dialogue Systems for Health Communication, American Association for Artificial Intelligence Fall Symposium Series (pp. 58-63). ACM Press.

HUBAL, R. (2005). Design and usability of military maintenance skills simulation training systems. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (pp. 2110-2114). HFES.

Evens, N., Whiteford, B., Frank, G., & HUBAL, R. (2006). User interface lessons learned from distributed simulations. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 1276-1285). NDIA.

Guinn, C., & HUBAL, R. (2006). Augmented transition networks (ATNs) for dialog control: A longitudinal study. In Proceedings of the International Conference on Computational Intelligence Special Session on Natural Language Processing for Real Life Applications (#523-815) (pp. 395-400). Calgary, AB: Acta Press.

HUBAL, R., & Day, R.S. (2006). Understanding the frequency and severity of side effects: Linguistic, numeric, and visual representations. In Proceedings of the Workshop on Argumentation for Consumers of Healthcare, American Association for Artificial Intelligence Spring Symposium Series (pp. 69-75). ACM Press.

Kizakevich, P., Furberg, R., HUBAL, R., & Frank, G. (2006). Virtual reality simulation for multicasualty triage training. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 170-177). NDIA.

Frank, G., HUBAL, R., & O'Bea, M. (2007). Using competency definitions to adapt training for mission success. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 1262-1270). NDIA.

Publications, cont'd.

Frank, G.A., & HUBAL, R.C. (2007). Modeling affective reactions for training adaptive interviewing. In Proceedings of the Behavior Representation in Modeling and Simulation Conference. SISO.

HUBAL, R., Staszewski, J., & Marrin, S. (2007). Overcoming decision making bias: Training implications for intelligence and leadership. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 798-808). NDIA.

Frank, G., Evens, N., HUBAL, R., & Whiteford, B. (2008). Automated, interactive AARs: A positive spin. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 67-76). NDIA.

Frank, G.A., & HUBAL, R.C. (2008). Bias inoculation advanced simulation (BIAS) training. In Proceedings of the Behavior Representation in Modeling and Simulation conference. Simulation Interoperability Standards Organization.

HUBAL, R. (2008). Criteria for use of synthetic characters. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 1274-1283). NDIA.

HUBAL, R., & Frank, G. (2008). Enticing mistakes: A strategy within simulation training of soft skills. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 57-66). NDIA.

Krizowsky, P., Waters, H., Wright, M., HUBAL, R., & Frank, G. (2008). Dynamically configured scenarios for training adaptive network system operators. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 1392-1399). NDIA.

Waters, H., McDowell, M., Krizowsky, P., Frank, G., HUBAL, R., & Whiteford, B. (2008). Reusing simulation assets for qualification and sustainment training. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 1155-1163). NDIA.

HUBAL, R. (2009). Between- and within-subjects experiences with desktop simulations. In Proceedings of the Workshop on Users' Preferences Regarding Intelligent User Interfaces: Differences among Users and Changes over Time. ACM Press.

HUBAL, R., Kizakevich, P., McLean, A., & Hourani, L. (2010). A multimedia environment for stressing warfighters before they deploy. In Proceedings of the Interservice/Industry Training, Simulation and Education Conference (pp. 1688-1696). NDIA.

HUBAL, R., Mitroff, S.R., Cain, M.S., Scott, B., & DeWitt, R. (2010). Simulating a vigilance task: Extensible technology for baggage security assessment and training. In Proceedings of the IEEE Conference on Technologies for Homeland Security (pp. 543-548). IEEE. [\[doi\]](#)

Publications, cont'd.

HUBAL, R. (2012). The imperative for social competency prediction. In S.J. Yang, A.M. Greenberg, & M. Endsley (Eds.), *Proceedings of the International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction* (pp. 188-195). Springer-Verlag. [\[doi\]](#)

HUBAL, R., Folsom-Kovarik, J., Woods, A., Jones, R., & Carbone, J. (2015). Patterns of life in the foreground and background: Practical approaches to enhancing simulation-based interaction skills training. In *Proceedings of the Behavior Representation in Modeling and Simulation Conference* (pp. 75-83). The BRIMS Society.

Taylor, G., Purman, B., Schermerhorn, P., Garcia-Sampedro, G., HUBAL, R., Crabtree, K., Rowe, A., & Spriggs, S. (2015). Multi-modal interaction for UAS control. In *Proceedings of the Unmanned Systems Technology Conference, Symposium on SPIE Defense + Security*, 9468(1). [\[doi\]](#)

HUBAL, R., van Lent, M., Marinier, B., Kawatsu, C., & Bechtel, B. (2015). Enhancing good stranger skills: A method and study. In *Proceedings of the Interservice/Industry Training, Simulation and Education Conference* (pp. 1437-1447). NDIA.

Selected Research Experience

Virtual Human Technology

Investigated use of EMBODIED CONVERSATIONAL AGENTS for interaction training and assessment. Applications developed or in progress include assessing medical practitioners in history taking for both asthmatic and pediatric patients, training civilian police officers in how to handle mentally disturbed individuals, and training telephone and field interview staff in obtaining respondent participation.

Contributed to INTERACTIVE MODELS OF EMOTION, PHYSIOLOGY, AND SOCIAL COGNITION. Applications developed or in progress include embodied conversational agent patients potentially exposed to bioterrorist attacks, a multimodal stressor environment used for stress control, a security setting for vigilance studies, and a telemedicine initiative to study best approaches to establish human-agent rapport.

Developed VIRTUAL VIGNETTES FOR a project designed to identify the underlying neurocognitive and emotional regulatory mechanisms in BEHAVIORAL DISORDERS that at-risk youth and prison inmates often present and to understand how these mechanisms influence treatment outcomes.

As part of a set of studies to assess social functioning deficits in childhood cancer survivors as compared to healthy children, developed a STANDARDIZED INSTRUMENT FOR FACIAL EXPRESSION RECOGNITION employing Facial Action Coding System action units to systematically manipulate facial expressions, and an easy-to-use interface for the target pediatric population.

Investigated models of CULTURAL daily activities and PATTERNS OF LIFE integrated into simulations of synthetic characters inhabiting an urban environment, addressing background at scale, variation, and anomaly and normalcy. Interleaved representation of two classes of agent patterns that act in concert to present a cohesive scenario: fuzzy state machines for low level 'clutter' presentation of many individuals, and sophisticated cognitive agents for emulating high-value individuals.

Focused on developing an AUTOMATED LANGUAGE-BASED ASSESSMENT system using avatar-based verbal instructions. Demonstrated the implementation of speech recognition using a virtual neuropsychologist that is sufficiently accurate to permit computer administration of verbally-based neuropsychological tasks including word-list learning, confrontation naming, and aural comprehension.

Selected Research Experience, cont'd.

Vigilance & Resilience

Investigated INDIVIDUAL DIFFERENCES IN THE INHERENT ABILITY TO SUSTAIN VIGILANCE, and most effective approaches for training and improving sustained vigilance for rare items or events. Addressed these questions in two research tasks, corresponding to two specific hypotheses: (1) Tailored training using a simulated environment can be used to improve sustained vigilance, as evidenced by performance on a target detection task; (2) Neural stimulation can be used to improve sustained vigilance, also as evidenced by performance on a target detection task. Used tasks and dependent measures used in prior studies, manipulating background to include a simulation for training. Introduced various forms of stress on participants, and considered issues of anticipation, interruption, and resumption of job duties.

In a study comparing (i) PRE-DEPLOYMENT STRESS INOCULATION TRAINING (PreSIT) involving coping skills training comprised of attentional retraining and focused breathing with biofeedback against (ii) the current best practice of providing educational materials on combat and operational stress control, developed a MULTIMEDIA STRESSOR ENVIRONMENT for simulating stress exposure for participants to practice learned coping skills.

Developed a COGNITIVE FLEXIBILITY AND RESILIENCE TRAINING CURRICULUM to address Marine resilience training and assessment. Using past curriculum development experience, direct experience training and assessing Marines in resilience techniques, cost-effective designs of a mix of learning and assessment technologies, and adaptive simulation training, developed a curriculum to support Marine resilience training that is scientifically validated, intuitive for all instructors—novice to expert—to implement, Marine friendly, supportive of Marines both inside and outside the classroom, and in line with Navy goals for training modernization.

Technology Assisted Learning

Evaluated the COST-EFFECTIVENESS OF A VIRTUAL REALITY MAINTENANCE TRAINING PROGRAM. Considered cognitive knowledge gain, affect towards learning environment, group dynamics, and effect of training in this virtual environment on testing using live and constructive environments. Included in design of experiment investigation into the role of experience and effects on optimal training environment.

Contributed to EVALUATION OF A SIMULATION TO TRAIN 'SCIENCE' AND 'ART' FOR BATTALION AND BRIGADE SIGNAL OFFICERS. Science training focuses on the installation, operation, and maintenance of Army and Joint battlefield operating systems, while art training focuses on planning, management, security, information assurance and dissemination, and systems administration for these digital networks.

Working with UNC research staff, managed project to provide MULTIMEDIA ON THE EFFECT OF BLOOD ALCOHOL LEVEL ON DRIVING AND NEUROBIOLOGY in support of a middle-school program focused on the brain. The application allows students to see how increased blood alcohol levels affect the body, cellular functions, and reaction time.

Selected Research Experience, cont'd.

Worked on a project involving methods for DETERMINING STUDENT PATTERNS AND BUILDING PERFORMANCE PROFILES FROM STANDARDIZED TESTING DATA. Purpose of the study was to provide more useful data to inform instruction and remediation. Sought to detect and describe general patterns in student performance for different groups of students, so that instructionally relevant performance profiles can be constructed. Approach involved algorithmic, statistical, and network analyses.

Studied the environment in which EXPERT SECURITY ANALYSTS work, to assist in developing an INFORMATION-PROCESSING model of the knowledge and skill that expert intelligence analysts use to produce the highest quality intelligence.

Worked on an INTELLIGENT TUTORING technical base by closing the feedback loop between student results and suggested remediation. A remediation algorithm accepts students' after-action review results, course performance measures, and student results and makes recommendations on what lessons or lesson 'chunks' students should run to correct deficiencies in their performance.

Member of a team responsible for organizing, convening, documenting, and summarizing two MILITARY SYMPOSIA ON LEARNING AND TRAINING EFFECTIVENESS, the first on individual training, the second on collective training.

Identified and developed training for the interaction skills WARFIGHTERS need to effect successful outcomes in SOCIAL ENCOUNTERS WITH STRANGERS in unfamiliar or hostile environments, for U.S. forces involved in operations that result in interaction with local civilians. Training centered on warfighters' approach and engagement with strangers, orientation to unfamiliar patterns of behavior, recovery from social errors, conflict de-escalation, transition in and out of force situations, and discovering and adapting to the unexpected.

Visual Analytics & Representation

Investigated VISUAL ANALYTICS, which allow for looking at data prospectively and visually. As part of this effort, studied the tools, techniques, and data organization needed to perform visual analytics. Looked into applying to computational toxicology program in attempt to understand the complex relationships between environmental exposures and health outcomes.

Studied approaches to deriving MENTAL MODELS to ultimately develop training to encourage adaptive thinking about test, measurement, and diagnostic equipment. The intent was to develop an approach to modeling the structure and process of knowledge and skills exhibited by ordnance electronics maintenance personnel and to determine an approach to identifying differences between experts' models and novices' models. Investigated online sorting/categorization as the primary approach.

Selected Research Experience, cont'd.

Developed a PROCESS MODEL FOR alternative representations and investigated the interaction between EXPERTISE AND REPRESENTATION. Extended previous results to determine (i) what is the cognitive processing that leads to alternative representation performance differences, and (ii) how alternative representations affect experts versus novices. Also studied the interaction between alternative representations and types of tasks.

Linguistics & Codability

Investigated LINGUISTIC CODABILITY and its effects on perception and memory. Gathered, measured, and codified verbal descriptions of taste, then conducted a recognition memory task to find effect of codability. Compared results with codability ratings for odor.

Conducted LINGUISTIC ANALYSES OF SIDE EFFECTS TERMINOLOGY. Experiments, including those with UNC Pharmacy students, revealed dramatic overestimation by participants of adverse drug reaction frequency terms and misconceptions of severity terms. Analyzed inconsistencies in the terms used in professional medical information materials to denote frequency and severity information.

Devised dynamic EXPLANATION SYSTEMS for predictive analytics and advisory systems. The analytic tool is intended to help Intelligence analysts generate alternative hypotheses about a group's likely violent intentions and evaluate these hypotheses using quantitative models, backed by historical evidence from publicly available data. The advisory systems are intended for pediatric clinicians to offer appropriate health behavior guidelines and for military personnel to monitor their behaviors and engage with self-help interventions.

Selected Software Development Experience

Co-designed a personal health intervention tool to help build resilience in healthy troops and support prevention in high-risk military personnel with subclinical psychological symptoms.

Co-designed and developed an environment for teaching and assessing social skills in dynamic social and tactical scenarios.

Co-developed a multimedia stressor environment for use in training of coping skills for individuals being deployed and expected to experience stressful situations.

Co-developed a trademarked advanced technology application toolkit, using responsive virtual human software and a natural language interface, for teaching client interaction and soft skills and for marketing purposes.

Co-developed an explanation system to interpret the motivations and behaviors of violent groups and identify factors indicating that a group may engage in ideologically motivated violent activity.

Designed a self-improving testing and evaluation system for elementary school mathematics.

Developed a computer simulation of the environment in which expert security analysts work.

Developed a digital facial recognition application as a tool to measure nonverbal deficits in pediatric cancer survivors.

Developed a flexible gaze control program for use in eye tracking and stress relaxation studies.

Developed a series of vignettes to invoke a specific cognitive function consistent with risky decision-making, impulsivity, and sensitivity to penalties.

Developed a web site to serve as an information service providing data on public schools.

Developed a web-based knowledge engineering toolset to enable subject matter experts to directly input experience and vignettes for use in an interaction tool.

Developed an interactive training application for medical students rotating through pediatrics to learn to handle pediatric patients.

Developed an interactive training application for police officers to learn to manage encounters with mentally disturbed subjects.

Developed an interactive training application for researchers learning informed consent procedures.

Selected Software Development Experience, cont'd.

Developed vignettes designed to identify the underlying neurocognitive and emotional regulatory mechanisms in behavioral disorders that inmates often present and to understand how these mechanisms influence treatment outcomes.

Managed development of a web-based, externally-controlled simulation of baggage screening for a more ecologically valid study of vigilance.

Managed development of an automated language-based assessment system that is primarily self-administering with clearly presented directions to a patient using both visual illustrations and avatar-based verbal instructions.

Managed project to provide multimedia on the effect of blood alcohol level on driving and neurobiology.

Selected Project Funding

Evaluation of live, virtual, and constructive training environments
U.S. Army Research Office, 1997

Learning & training effectiveness symposia
U.S. Army Training Support Center, 1999

JUST-TALK: Interactive computer-based training in assessing incidents using verbal dialogs
National Institute of Justice, 2000-2002

U.S. Army M1A2 system enhancement package maintenance training system
Simulation, Training & Instrumentation Command, 2000-2002

Responsive virtual human technology (PI)
National Science Foundation, 2001-2006

Human subjects research enhancements program
National Institutes of Health, 2002-2003

Neuropsychological and emotional deficits predict correctional treatment response
National Institute of Justice, 2002-2004

Simulation environment for analysis of expert security analysts (co-PI)
[government client], 2004-2006

Common driver trainer initial capabilities document and supporting analyses
U.S. Army Research Institute, 2005

Drunk driving simulator in support of the Brain Explorers Program
National Institute on Alcohol Abuse and Alcoholism, 2005-2007

Medical simulation training for first response to chemical, biological, radiological, and nuclear events
Telemedicine and Advanced Technologies Research Center, 2005

Collaborative systems involving synthetic characters and high-risk adolescents (PI)
National Science Foundation, 2006-2009

Simulation-based Triage Training Plan
U.S. Agency for International Development, 2006

Advanced equipment maintenance training using revolutionary video game technology
Office of Naval Research, 2007

Farris triage training simulation (Sim-Patient – Generation III)
U.S. Army Training and Doctrine Command, 2007-2008

Selected Project Funding, cont'd.

Combat stress casualty reduction: Development and testing of a predeployment stress inoculation training program

Office of Naval Research, 2008-2012

Combat stress casualty reduction: Predeployment stress inoculation training

U.S. Army Medical Research and Materiel Command, 2008-2010

Mental models for effective training: Comparing expert and novice maintainers' mental models (PI)

U.S. Army Research Institute, 2008-2009

Personal monitoring for ambulatory PTSD assessment

Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury, 2008-2010

Violent intent modeling and simulation

Department of Homeland Security, 2008-2009

Individual differences in vigilance (PI)

Institute for Homeland Security Solutions, 2009-2010

Methods for determining student patterns and building performance profiles (PI)

[commercial client], 2010-2011

PHIT for Duty, a personal health improvement tool for psychological health and traumatic brain injury

U.S. Army Medical Research and Materiel Command, 2011-2012

Strategic social interaction modules

Defense Advanced Research Projects Agency, 2012-2015

Cultural urban synthetic characters and their patterns of life (PI)

U.S. Army Program Executive Office for Simulation, Training, & Instrumentation, 2013-2014

AVANT: An avatar-based neuropsychological battery administrator (PI)

Telemedicine & Advanced Technology Research Center, 2013-date

CRAFT: Cognitive resilience and flexibility training (PI)

Office of Naval Research, 2015-2016

Center for Innovation in Pharmacy Simulation

UNC Eshelman Institute for Innovation, 2016-date

Selected Professional Affiliations & Activities

Member

Association for Psychological Science
Human Factors and Ergonomics Society
International Association of CyberPsychology, Training, and Rehabilitation
Society for Simulation in Healthcare

Panel Member & Lecturer

Army Learning and Training Effectiveness Symposium
East Coast Game Conference
Human Factors and Ergonomics Society Serious Games Discussion
Institute for Homeland Security Solutions Research Summit
U.S. Air Force Expertise Workshop

Panel Reviewer

Military Operational Medicine Joint Program Committee
National Institute on Mental Health
National Science Foundation

Program Committee

Cross-Cultural Decision-Making Conference
International Conference on Intelligent User Interfaces
International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction

Submissions Reviewer

Cognitive Science Society
Computers in Human Behavior
Human Factors and Ergonomics Society
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IEEE Visual Analytics Science and Technology (VAST) Challenge
Journal of Biomedical Informatics
Journal of CyberTherapy & Rehabilitation
Military Medicine
RTI Press

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