

Frederic (Rick) D. McKenzie, PhD

Professor and Chair

Old Dominion University

Modeling, Simulation, and Visualization Engineering Department

Joint Appointment, Electrical and Computer Engineering Department

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EDUCATION

Ph.D. in Computer Engineering, University of Central Florida, May 1994,

Research area: Model-based diagnostic reasoning.

Masters of Science in Computer Engineering, University of Central Florida, May 1990.

Bachelor of Science in Engineering, University of Central Florida, May 1988.

EXPERIENCE

June 2013 – Present: *Department Chair, Old Dominion University,*

Modeling, Simulation and Visualization Engineering (MSVE) Dept., Norfolk, VA.

March 2011 – Present: *Promotion to Full Professor, Old Dominion University,*

Modeling, Simulation and Visualization Engineering (MSVE) Dept., Norfolk, VA.

March 2010 – June 2013: *Graduate Program Director, Old Dominion University,*

Modeling, Simulation and Visualization Engineering (MSVE) Dept., Norfolk, VA.

January 2010 – Present: *Adjunct Associate Professor, Eastern Virginia Medical School (EVMS),* School of Health Professions, Norfolk, VA.

Summer 2007 – Present: *Director of the Medical Imaging, Diagnosis, and Analysis (MIDA) Laboratory, Old Dominion University,* Department of Electrical and Computer Engineering (ECE) - Norfolk, VA.

August 2010 – Present: *Graduate Faculty Scholar, University of Central Florida (UCF),* School of Electrical Engineering and Computer Science, Orlando, FL.

April 2005 – March 2011: *Tenure and Promotion to Associate Professor, Old Dominion University,* Department of Electrical and Computer Engineering - Norfolk, VA.

August 1999 – Present: *Faculty Member, Old Dominion University,* MSVE Department and joint appointment in ECE Dept. - Norfolk, Virginia.

Oct. 1997 – August 1999: *Senior Scientist, Joint Simulation System (JSIMS) Project -* Science Applications International Corporation (SAIC) Orlando, FL.

- Team Lead for about 22 engineers in the JSIMS External Systems Interfaces (ESI) Working Integrated Product Team (WIPT).
- Manage the development of work products associated with an Object Oriented Software Development Process.
- Present and discuss progress and updates of designs to government agencies.

April 1995 - Oct. 1997: **Senior Scientist, Advanced Distributed Simulation (ADS)**

Research Team - SAIC Orlando, FL.

- Project Director for the Modular Reconfigurable C4I Interface (MRCI) project.
- Project Director on the Command Decision Modeling (CDM) project.
- Active member of the Software Engineering Process Group (SEPG) at SAIC Orlando - a Software Engineering Institute (SEI) level 3 organization.

August 1996 - Dec. 1996: **Adjunct Faculty, University of Central Florida (UCF)**

Department of Electrical and Computer Engineering - Orlando, FL.

- Taught EEL 6878 - Modeling and Artificial Intelligence. Course covered Intelligent Tutoring Systems, knowledge-based reasoning, and Distributed Interactive Simulation.

July 1993 - April 1995: **Scientist, Integrated Development Team (IDT)** - Science

Applications International Corporation (SAIC) Orlando, FL.

- Used various OO design tools and methodologies (ObjectMaker, Rational Apex, Rumbaugh, Buhr) to carry out the design and development of sophisticated distributed simulation software.

Sept. 1990 - Oct. 1993: **Research & Teaching Assistant**, UCF Electrical & Computer Engineering Dept.

- Taught ECM4230 - C, C++, Data Structures & Taught EGN3211 - FORTRAN.
- Researched issues concerning Automated Knowledge Generation (AKG) from CAD data using NASA Kennedy Space Center's control & diagnostic system called Knowledge Automated Test Engineer (KATE). Translated over 90% of the KATE system from LISP to C++ on Sun/Unix workstation.
- Redesigned and optimized this system to diagnose a space station power distribution network patterned after the system on Space Station Freedom at NASA Marshall Space Flight Center (MSFC) in real-time.

SUMMARY STATEMENT

Dr. McKenzie is the Department Chair in ODU's new Modeling, Simulation and Visualization Engineering (MSVE) Dept. and a joint faculty member in the Department of Electrical and Computer Engineering (ECE) at Old Dominion University. In addition, he is the director of the Medical Imaging, Diagnosis, and Analysis (MIDA) Laboratory, Adjunct Associate Professor of Eastern Virginia Medical School (EVMS) in the School of Health Professions, and Graduate Faculty Scholar at University of Central Florida (UCF) in the School of Electrical Engineering and Computer Science. Before coming to Old Dominion University, Dr. McKenzie spent 6 years in the simulation industry as a senior scientist.

Dr. McKenzie's research has been in medical modeling and simulation, human behavior representation, and simulation architectures often focusing on aspects of scientific visualization and virtual reality. For the past 10 years he has fostered collaborative ongoing efforts with 1) Drs. Nuss, Kelly, and Obermeyer (Children's Hospital of the King's Daughters) in the determining the cause of pectus excavatum (PE) and developing tools to aid in the planning and conduct of the minimally invasive Nuss procedure for treating PE; with 2) Thomas Hubbard, MD (Eastern Virginia Medical School) instrumenting standardized patients to improve the quality of professional skills training for medical students where Dr. McKenzie coined the term augmented standardized patient (ASP); and with 3) Drs. Paul Schellhammer, John Semmes and the EVMS proteomics center which has resulted in successful preliminary results combining molecular imaging (MALDI) with optical imaging for supporting prostate cancer biomarker identification.

GRANTS AWARDED

- Physical Simulator for Nuss Procedure Training, Children's Hospital of the King's Daughters (CHKD) - Children's Surgical Specialty Group (CSSG), PI Rick McKenzie, \$15,000, Summer 2014 - Fall 2014.
- Haptic-Enabled Simulator for a NUSS Procedure Planner and Trainer, Children's Hospital of the King's Daughters (CHKD) - Children's Surgical Specialty Group (CSSG), PI Rick McKenzie, \$285,000 August 2012 - October 2014.
- Physical Simulator for Nuss Procedure Training, Children's Hospital of the King's Daughters (CHKD) - Children's Surgical Specialty Group (CSSG), PI Rick McKenzie, \$7,650, Spring 2013 - Spring 2014.
- Simulation and Education in Evergreen-Agriculture Decision-making (SEED) for Subsistence Farmers, ODU Office of Research, PI Rick McKenzie, \$64,063, Jan. 2012 to Oct. 2012.
- Collaborative Research: Engineering Laboratory Instruction in Immersive Virtual Environments (ENLIIVEN), NSF, PI Sushil Chaturvedi, Co-PI Rick McKenzie. \$198,536. 17% summer time. Jan. 2011 - Dec. 2012.
- Nuss Procedure Simulator Planner, CHKD - Children's Surgical Specialty Group (CSSG), PI Rick McKenzie, \$50,000 Fall 2010 - Summer 2012.

- Communication Outcomes for Naming Treatments in Aphasia: American Recovery and Reinvestment Act (ARRA) Supplemental Grant, National Institutes of Health (NIH), PI Stacie Raymer, Co-PI Rick McKenzie, \$34,587, Fall 2009 to Fall 2010.
- Cognitive Modeling for Closed-Loop Task Mitigation, NASA SBIR, PI Jiang Li, Co-PI Rick McKenzie, 2 months Summer, Spring 2010 – Fall 2011.
- Cyberknife Radiation Modeling: Effects of Reduced Parameter Corrections on Healthy Tissue Irradiation, EVMS Dept. of Radiology, PI Rick McKenzie, \$9,792, Fall 2009 to Spring 2010.
- Modeling and Simulation Solutions for Standardized Patients: Selection, Refinement, and Augmentation, EVMS, PI Mark Scerbo, Co-PI Rick McKenzie, support for 2 graduate students, Fall 2009 – October 2010.
- Simulation and Visualization Enhanced Engineering Education, NSF, PI Sushil Chaturvedi, Co-PI Rick McKenzie. \$999,741. Fall 2005 – Summer 2009.
- Quality Dental Implant Site Preparation and Placement Using 3D Imaging and Robotics, PI Jiang Li, Co-PI Rick McKenzie Fall 2008 to Summer 2009. \$41,397.
- Health iManage (HiM): Incentivized Type 2 Diabetes Management Using I-Phone Technology, ODU Office of Research, PI Rick McKenzie, Spring 2009 to Summer 2009, \$27,000.
- Hybrid Texture Imaging and Molecular Biomarker Classification of Prostate Cancer Tumor Cells, ODU Office of Research, PI Jiang Li, Co-PI Rick McKenzie, Spring 2009 to Summer 2009, \$79,997.00.
- Physics Based Process Simulation and Models with Stochastic Variability and Visualization, Northrop Grumman, PI Ravi Joshi, Co-PI Rick McKenzie, Fall 2008 to Spring 2009, \$115,976.
- Co-PI - National Center for Collaboration in Medical Modeling and Simulation (NCCMMS), (Fall 2006 – Fall 2009), \$1,399,943, NAVAIR Orlando, 4 person months per year.
- Crowd Behavior Modeling in Massively Multi-Player On-line Games, RDE-COM, PI Rick McKenzie. \$48,000. Summer 2007 – Fall 2007.
- PI - Agent-Based Modeling Short Course Development and Conduct, (Fall 2007), \$60,000, NASA Langley.
- PI - Discrete Event Simulation Asynchronous Course Development, (Fall 2007 – Spring 2008), \$32,000. Old Dominion University Office of Research.
- Crowd Behavior Modeling (3rd Award), DMSO, AFRL, JFCOM, PI Rick McKenzie. \$468,000. Summer 2005 – Fall 2006.
- The Augmented Standardized Patient: Using Augmented Reality for Assessment, Stemmler Medical Education Research Fund. PI Rick McKenzie, \$70,000. Summer 2005 – Fall 2006.
- Human Performance Modeling using Circadian Rhythms, USAMRMC, PI Rick McKenzie, \$100,000, Fall 2004 – Summer 2005.
- Quantifying Prostate Surgery Success (3rd Award), EVMS, PI Rick McKenzie, \$10,000. Fall 2004.
- The National Center for Collaboration in Medical Modeling and Simulation (NCCMMS), NAVAIR Orlando, PI Bowen Loftin, Approx. 25% release time for Rick McKenzie, Spring 2004 – Fall 2005.

- Crowd Behavior Modeling (2nd Award), DMSO, PI Rick McKenzie, PI Mikel Petty. Approximately \$490,000. Fall 2004 – Summer 2005.
- NSF Planning Grant: Simulation and Visualization Enhanced Engineering Education, NSF, PI Sushil Chaturvedi, Co-PI Rick McKenzie. \$99,895. Fall 2003.
- Composable, Reconfigurable, Environment for Acquisition, Training and Experimentation (CREATE), DMSO, Co-PI Rick McKenzie. \$42,500 (Project Total: \$298,925, Fall 2002 to Spring 2004).
- Quantifying Prostate Surgery Success (2nd Award), EVMS, PI Rick McKenzie, \$18,816. Spring 2003 to Spring 2004.
- Virtual Environments for Training, ONR, PI R. Bowen Loftin, Co-PIs Rick McKenzie and Mark Scerbo. \$1,556,000. Oct. 2000 – September 2002.
- Quantifying Prostate Surgery Success, EVMS, PI Rick McKenzie, \$31,954. CY 2002.
- Formal Methods for Simulation Architectures, STRICOM, PI Mikel Petty, Co-PI Rick McKenzie. \$45,000. Fall 2001-Spring 2002.
- Joint Battlespace Environment (JBE) IITSEC Integration, JFCOM J7, PI Mark Phillips, Co-PI Rick McKenzie. \$42,000. Fall 2001.
- Joint Futures Predicting Intentions, JFCOM J9, PI Mikel Petty, Co-PIs Rick McKenzie, Jeff McNeil, and Mark Phillips. \$30,000. Spring 2001.
- Personality-based Human Behavior Modeling, VMASC IR&D, PI Rick McKenzie. \$25,000. Summer 2000.
- 2D/3D Navigation Display sponsored by WR Systems, PI Dave Dryer, Co-PI Rick McKenzie. \$30,000. Spring 2000.

PATENTS

- Method and System for Automated Dental Implatation. January 2012. US Provisional Patent Application. No. 61/584,594.
- Method and Device for Natural Root Form Dental Implants. January 2012. US Provisional Patent Appln. No. 61/584,619.
- Surgical Tool for Pectus Bar Extraction. Utility. Jan, 22, 2010. Ref. #US 12/692,232.
- Subject Actuated System and Method for Simulating Normal and Abnormal Medical Conditions. Utility. Oct. 31, 2006. Ref. #113019.224US.
- System, method, and medium for simulating normal and abnormal medical conditions. Provisional. Oct. 25, 2004. Utility. Ref. #60/621084. **Now commercial product:** <http://www.cardionics.com/stanPattheStandardizedPatientAuscultationSystem.htm>
- Surgical simulator to support wound debridement. Provisional. July 2005. Prov. #60/706414.
- Crowd Federate architecture and API design. Provisional. April 18, 2005. Prov. #60/672458. Updated to Utility patent February 2006.

CONSULTING ACTIVITIES

- HLA Instruction, NASA Langley, 2005.

- Advanced Distributed Simulation, Science Applications Int'l Corporation (SAIC), 1999 - 2000.

HONORS, AWARDS, CERTIFICATES AND PRIZES

- IEEE Senior Member
- ODU University Doctoral Mentoring Award 2013
- ODU ECE Department 2007/2008 Researcher of the Year.
- Modeling & Simulation Professional Certification Commission (M&SPCC) Certified Modeling and Simulation Professional (CMSP). December 2002.
- HIPAA Research Training Certificate - ongoing.
- NIH Protection of Human Research Subjects Certificate - ongoing.
- Global Command and Control System (GCCS) Operator Training. 1997.
- Project Management II, April 1997.
- Project Management I, May 1996.
- Team Building, January 1996.
- ModSAF User / Developer Training. November 1996.
- How to be a Better Team Leader, January 1995.
- Engineering Intern (EI) certificate. 1987.

COURSES TAUGHT

ENGN 110/111 - Explore Engineering and Technology

- Notes Handout on Discrete Event Simulation

MSIM 205 - Discrete Event Simulation

- Required Text: Kelton, Smith, Sturrock, Verbraeck, Simio and Simulation: Modeling, Analysis, Applications, McGraw-Hill Learning Solutions, ISBN-13: 978-0-07-340888-3
- Reference Text: Banks, Carson, Nelson & Nicol, Discrete-Event System Simulation

MSIM 310 - Model Engineering

- Required Text: Required Text: UML 2 ToolKit, ISBN: 0-471-46361-2.

ECE 462/562 - Medical Imaging and Simulation (Co-instructed Spring 2008/2009)

- Required Text: Atam Dhawan, Medical Image Analysis, Wiley-IEEE Press, 2003. ISBN: 0471451312

ECE 405/505 - Introduction to Discrete Event Simulation

- Required Text: A. M. Law and W. D. Kelton, *Simulation Modeling and Analysis*, Third Edition, McGraw-Hill, New York, NY, 2000. ISBN: 0-07-059292-6
- Required Text: W. D. Kelton, R. P. Sadowski, and D. T. Sturrock: *Simulation with Arena*, Third Edition, WCB/McGraw-Hill, Boston, MA, 2002. Version with software enclosed. ISBN: 0-07-291981-7.

MSIM 601 - Introduction to Modeling & Simulation (DES section)

- Notes Handout

ECE 605 – Engineering Systems Modeling

- Required Text: Paul A. Fishwick, *Simulation Model Design and Execution: Building Digital Worlds*, Prentice Hall, 1995. ISBN-0-13-098609-7.
- Required Text: UML Distilled: A Brief Guide to the Standard Object Modeling Language by Martin Fowler, Kendall Scott. Addison-Wesley Pub Co; 2nd edition (August 25, 1999) ISBN: 020165783X.
- Concepts Covered: UML, Markov models, Bayesian networks, Petri nets, system dynamics, Bond graphs, cellular automata, and distributed simulation.

MSIM 710/810 – Advanced Discrete Event Simulation (Co-taught)

- Required Text: W. D. Kelton, R. P. Sadowski, and D. T. Sturrock: *Simulation with Arena*, Third Edition, WCB/McGraw-Hill, Boston, MA, 2002. Version with software enclosed. ISBN: 0-07-291981-7.

Others – Previously taught

- Intelligent tutoring systems, knowledge-based reasoning, C, C++, data structures, and Fortran

GRADUATE DEGREES SUPERVISED

- Austin Stoudenmire, Ph.D. MSIM, “Functional Near Infrared Detection of Real and Imagined Finger Taps Using Support Vector Machine, Linear Discriminant Analysis, and Decision Tree Classification Methods,” Old Dominion University, Dec. 2013.
- Mike White, Ph.D. MSIM, “A Framework for Delivering Contextually Appropriate Opportunities for Practice,” Old Dominion University, December 2012.
- Krzysztof Rechowicz, Ph.D. MSIM, “Development and Validation of the Nuss Procedure Surgical Planner,” Old Dominion University (ODU), August 2012.
- Dennis Bergin, Ph.D. MSIM, “Real-Time Virtual Pathology Using Signal Analysis and Synthesis,” Old Dominion University (ODU), August 2012
- Xiaoyan Sun, Ph.D. ECE, “Image-Guided Dental Implantation with Natural-Root-Formed Impants,” Old Dominion University (ODU), May 2012
- GyuTae Kim, Ph.D. ECE, “Statistical Optimizations of Muscle Action Potentials Based on Modeling and Analysis of Ion Channel Dynamics,” Old Dominion University (ODU), August 2011
- Bo Sun, Ph.D. MSIM, “Real-Time Ultrasound Simulation for Medical Training and Standardized Patient Assessment,” Old Dominion University (ODU), May 2008
- Rania Hussein, Ph.D. ECE, “An Adaptive Algorithm to Identify Ambiguous Prostate Capsule Boundary Lines for 3D Reconstruction and Quantitation,” Old Dominion University (ODU), August 2006
- Shuo Ren, “A Methodology for Comparing Learning Techniques in 3D Virtual Laboratories,” M.S. Thesis, MSIM, Old Dominion University (ODU), December 2012.
- Noham Kidane, “Orientation-Invariant ECG-Based Virtual Pathology Stethoscope Tracking for Standardized Patient Heart Auscultation,” M.S. Thesis, MSIM, Old Dominion University (ODU), December 2012.

- Sudha Potineni, "Cyberknife Radiation Modeling: Effects of Reduced Translational and Rotational Constraints on Healthy Tissue Irradiation," M.S. Thesis, ECE, Old Dominion University (ODU), August 2011.
- Sujith Surendran, "EKG Tracking for Augmented Standardized Patient Virtual Pathology Stethoscope Heart Auscultation," M.S. Thesis, ECE, Old Dominion University (ODU), May 2010
- Annette Castilano, "Augmented Skin Pathology for Simulation and Training" M.S. Thesis, ECE, Old Dominion University (ODU), December 2009
- Natalie Chuang, "Adjacent Slice Prostate Cancer Predication to Inform MALDI Imaging Biomarker Analyses," M.S. Thesis, ECE, Old Dominion University (ODU), August 2009.
- Swetha Purmandla, "Immersive Active Learning for Virtual Laboratory Experiments," M.S. Thesis, ECE, Old Dominion University (ODU), August 2008.
- ZhenZhen Yan, "An Approach to Identifying the Biomechanical Differences Between Intercostal Cartilage in Subjects with Pectus Excavatum and Normals In Vivo: Reconstruction and CT Registration," M.S. Thesis, ECE, Old Dominion University (ODU), May 2008.
- Taryn Cuper, "Investigation of a Validation Technique for the Registration of 3D Points Directly to Subjects with Pectus Excavatum," M.S. Thesis, MSIM, Old Dominion University (ODU), May 2008.
- Jason Loveland, "Integrating Game Technology and Discrete Event Simulation to Analyze Mass Casualty Scenarios," M.S. Thesis, MSIM, Old Dominion University (ODU), May 2008.
- Scott Guirlinger, "Simulation to Augment Standardized Patients in Obstetric Ultrasound Training," M.S. Thesis, MSIM, Old Dominion University (ODU), December 2007.
- Gurkan Haznedaroglu, "What Should be in Human Behavior Representation Federation Object Model for High Level Architecture," M.S. Thesis, ECE, Old Dominion University (ODU), May 2007.
- Reynel Castelino, "Augmented Reality for Auscultation in Standardized Patients," M.S. Thesis, ECE, Old Dominion University (ODU), December 2005.
- Sai Boyepadu, "Support for a Delivery Train Based Material Handling Mechanism," M.S. Thesis, ECE, Old Dominion University (ODU), August 2005.
- Fatemah Al-Douli, "Applying A Simulation-Based Real-time Decision Making Method to Mass Casualty Scenarios in Hospital Emergency Departments," M.S. Thesis, Old Dominion University (ODU), May 2005.
- Roger Wuerfel, "Distributed Simulation Data Flow Visualization Environment," M.E. Project, MSIM, ODU, May 2005.
- Sylva Girtelschmid, "Fine-tuning of mass-spring model properties for simulating realistic soft body deformation," M.S. Thesis, ODU, May 2005.
- Joseph Stoner, "Simulation of Cutting Human Tissue Using the Finite Element Method," M.E. Project, MSIM, ODU, May 2004.
- Adnan Jafri, "Development of an Efficient Interactive Federate to Manage and Monitor an HLA Federation Exercise Using the Management Object Model," M.S. Thesis, ODU, May 2003.

- Taimur K. Khan, "Approaching High Fidelity Human Tracking and Representation in Interactive Virtual Environments," M.S. Thesis, ODU, December 2002.
- Satyam Das, M.S. Project, Old Dominion University, May 2002.

CURRENT GRADUATE STUDENTS

Natalie Chuang, PhD, expected graduation, August 2013
 Salim Chemlal, PhD, expected graduation, August 2013
 Hector Garcia, PhD, expected graduation, December 2013 (Part Time)
 Kasi Vegesana, PhD, expected graduation, May 2014
 Nahom Kidane, PhD, expected graduation, May 2015
 Shuo (Andy) Ren, PhD, expected graduation, May 2015
 Mohammad Obeid, MS, expected graduation, December 2013
 Helen Heo, MS, expected graduation, August 2014

UNIVERSITY SERVICE

- College Tenure and Promotion Committee – MSVE Department representative, 2013
- Outstanding Graduate Teaching Assistant Awards Committee, 2012.
- University Ad-Hoc Working Group on Indirect Cost Returns, 2012.
- ODU Human Subjects Review Committee and Institutional Review Board (IRB) Engineering Member 2007-2013
- Faculty Senate Committee G - Faculty Status and Remuneration 2008-Present
- BCET Suspension & Appeals Committee – Committee Member Fall 1999 to 2013
- ODU Human Subjects Review Committee and Institutional Review Board (IRB) Engineering Alternate 2006-2007
- Electrical and Computer Engineering Department Graduate Committee 2008-2010
- BCET Suspension & Appeals Committee – Committee Chairman 2003-2006
- MSIM Graduate Program Committee 2005/2006
- Search Committees
 - MSVE Assistant Professor Fall 2010, VMASC Chief Scientist Summer 2010
 - VMASC Director Fall 2005, Spring 2010, ECE Department Chair Fall 2005
 - ECE Visualization Faculty Spring 2006, ME Mechatronics Faculty Spring 2006
 - ENMA Faculty Spring 2001 & 2006, ECE Faculty Spring 2001
- ECE Graduate Seminar invited talk Spring 2001, 2009

PROFESSIONAL SERVICE

- IEEE Senior Member 2005, Member since 1987.
- Association of Computing Machinery (ACM) Special Interest Group on Simulation (SIGSIM) -- Vice Chairman 2003 – Summer 2005.
- Association of Computing Machinery (ACM) Special Interest Group on Simulation (SIGSIM) Secretary/Treasurer December 1999 to 2003.

- General Chair, The 2012 Modeling, Simulation, and Visualization (MS&V) Student Capstone Conference.
- Keynote/Guest Speaker
 - Virginia Space Grant Consortium Luncheon, April 18, 2013, Norfolk, VA.
 - 13th Scientific Conference of the Association of Medical Residents, April 3-6, 2013, Rabat, Morocco.
 - 11th Annual Nuss Conference, March 21 & 22, 2013, Norfolk, VA.
 - 10th Annual Nuss Conference, March 29 & 30, 2012, Norfolk, VA.
- Technical Program Committee Member
 - AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference 2006
 - IEEE/ACIS International Conference on Computer and Information Science
- Expert Panelist on Human Behavior Representation, Behavior Representation in Modeling and Simulation (BRIMS), Universal City CA, May 2005.
- Expert Panelist on Healthcare Simulation Triangle, 10th Annual International Meeting on Simulation in Healthcare (IMSH 2010), Phoenix, Arizona, January 2010.
- Conference Special Session Organizer
 - Invited Session "Pediatric Treatment Modeling and Simulation" at the 4th International Conference on BioMedical Engineering and Informatics (BMEI 2011) October 2011.
 - Special Session in Biological Applications of Optimization in the AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, September 2006.
- Conference Tutorial
 - Crowd Modeling for M&S, Simulation Interoperability Workshop Fall 2006.
- Session Chair, Computer Aided Design (CAD) Conference, BioEngineering
- Proposal Reviewer, National Institutes of Health (NIH) Challenge Grants 2009.
- Proposal Reviewer, The Prostate Cancer Charity, Hammersmith, London, UK
- Reviewer, IEEE Transactions on Biomedical Engineering
- Reviewer, IEEE Transactions on Medical Imaging
- Reviewer, IET Image Processing
- Reviewer, IEEE Virtual Reality conference
- Reviewer, IEEE Computing in Science & Engineering (CiSE) magazine
- Reviewer, SIMULATION: Transactions of the Society for Modeling and Simulation International
- Reviewer, Information Sciences Journal, Elsevier
- Reviewer, SISO Behavior Representation in Modeling and Simulation (BRIMS)

COMMUNITY SERVICE

- Design judge for senior design, Norfolk State University Engineering Dept., 2009
- Virginia Beach Neighborhood Youth Soccer League U4 Coach, Fall 2005
- Design judge for School of the Future high school design competition, Spring 2000
- Engineering exposure after school lecture, Greenwich Middle School, Spring 2000.

PUBLICATIONS

Book Chapters:

Jiang Li, Natalie Chuang, Vamsi Mantena, Feng Li and Frederic D. McKenzie, "Application of Machine Learning Techniques to Biomarker Identification for Prostate Cancer," *Computational Techniques and Algorithms for Image Processing*. S. Ramakrishnan & Ibrahim M. M. El Emary, Editors. Lambert Academic Publishing (LAP), Germany, 2010. ISBN: 978-3-8433-5802-6.

Frederic D. McKenzie, "Systems Modeling: Analysis and Operations Research," *Modeling and Simulation Fundamentals: Theoretical Underpinnings and Practical Domains*. J. Sokolowski and C. Banks, Editors. John Wiley & Sons, Inc, 2010. ISBN: 978-0-470-48674-0, pp. 147-180.

R. B. Loftin, M. D. Petty, R. C. Gaskins , and F. D. McKenzie. "Modeling Crowd Behavior for Military Simulation Applications." *Organizational Simulation*, W. B. Rouse and K. R. Boff, Eds. John Wiley & Sons, Inc, 2005. ISBN: 0471681636, pp 471-536.

Book Articles and Editorials:

Obeid, M. F., Chemlal, S., Rechowicz, K. J., Heo, E.-s., Kelly, R. E. and McKenzie, F. D.: Improvement of a virtual pivot for minimally invasive surgery simulators using haptic augmentation. In: *Augmented Environments for Computer-Assisted Interventions, 9th International Workshop, AE-CAI 2014, Held in Conjunction with MICCAI 2014. Lecture Notes in Computer Science*, vol. 8678, pp. 70-79. Springer International Publishing (2014).

Krzysztof J. Rechowicz, Mohammad F. Obeid and Frederic D. McKenzie, "Patient Specific Modeling of Pectus Excavatum for the Nuss Procedure Simulation," Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization special issue on MWBIVPCS 2013 - MICCAI workshop on Bio- Imaging and Visualization for Patient-Customized Simulations, Springer International Publishing, João Manuel R. S. Tavares, Xiongbiao Luo, and Shuo Li Editors, 2013, pp.113-125.

Loc Tran, Frederic McKenzie, Jihong Wang, Jiang Li, "Large-Scale Manifold Learning Using an Adaptive Sparse Neighbor Selection Approach for Brain Tumor Progression Prediction," *International Journal of Computerized Medical Imaging and Graphics special issue on Machine Learning in Medical Imaging (MLMI)*. Lecture Notes in Computer Science, Volume 8184, Wu, Zhang, Shen, Yan, Suzuki, Wang Editors, 2013, Springer, pp. 219-226.

Sun, Bo, Frederic D. McKenzie, Hector M. Garcia, Thomas Hubbard, John Ullian, Gayle Gliva, "Medical Student Evaluation using Augmented Standardized Patients: New Development and Results," *Medicine Meets Virtual Reality 15 - in vivo, in vitro, in silico: Designing the Next in Medicine*, Edited by James D. Westwood, Randy S. Haluck, Helene M. Hoffman, Greg T. Mogel, Roger Phillips, Richard A. Robb, Kirby G. Vosburgh. Volume 125, pp. 454 - 456, IOS Press, 2007, ISBN 978-1-58603-713-0.

McKenzie, Frederic D., Thomas Hubbard, John Ullian, Hector M. Garcia, Reynel Castelino, Gayle Gliva. "Medical Student Evaluation using Augmented Standardized Patients: Preliminary Results." In *Medicine Meets Virtual Reality 14 - Accelerating Change in Healthcare: Next Medical Toolkit*. Edited by James D. Westwood, Randy S. Haluck, Helene M. Hoffman, Greg T. Mogel, Roger Phillips, Richard A. Robb, Kirby G. Vosburgh, Volume 119, pp. 379 - 384, IOS Press, 2006, ISBN 978-1-58603-583-9.

H. Myler, A. Gonzalez, M. Towhidnejad, F. McKenzie, R. Kladke. "Automated knowledge generation from incomplete CAD data: Research results." *Advances in Artificial Intelligence*, Volume II. Mark Fishman, Editor. JAI Press, 1991.

A. Gonzalez, H. Myler, M. Towhidnejad, F. McKenzie, R. Kladke, R. Laureano. "Automated extraction of knowledge from CAD databases." *Knowledge Discovery in Databases*. W. Frawley and G. Piatetsky-Shapiro, Editors. AAAI Press, 1991.

Journal Papers:

Frederic D. McKenzie, "Medical Simulation: Utilize, Inspire, Embrace, Verify," *International Journal of Medicine & Surgery (IJMS)*, Editorial, Vol 1, No 1 (2014), Peer Reviewed On-Line Open Access Journal (mbmj.org/index.php/ijms/index), ISSN: 2336-0313.

Emin Kugu, Jiang Li, Frederic D. McKenzie, Ozgur Koray Sahingoz. "Fuzzy Logic Approach and Sensitivity Analysis for Agent-Based Crowd Injury Modeling." *SIMULATION*, Vol. 90, No. 3, 2014, pp. 320-336.

K. J. Rechowicz, M. F. Obeid, S. Chemlal, and F. D. McKenzie, "Simulation of the Critical Steps of the Nuss Procedure," *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization*, pp. 1-15, 2014. DOI: 10.1080/21681163.2014.895681.

Kidane, Nahom, Salim Chemlal, Jiang Li, Frederic D. McKenzie, and Tom Hubbard. "Orientation invariant ECG-based stethoscope tracking for heart auscultation training on augmented standardized patients." *SIMULATION*, Vol. 89, No. 12, 2013, pp. 1450-1458.

Krzysztof J Rechowicz and Frederic D McKenzie. " Development and validation methodology of the Nuss procedure surgical planner." *SIMULATION*, Vol. 89, No. 12, 2013, pp. 1474-1488.

Collins, Andrew J., Kasi Bharath Vegesana, Michael J. Seiler¹, Patrick O'Shen, Prasanna Hettiarachchi and Frederic McKenzie, "Simulation and Mathematical Programming Decision-making Support for Smallholder Farming," *Environment Systems and Decisions*, Volume 33, Issue 3, September 2013, pp 427-439.

Tran, Loc, Debrup Banerjee, Jihong Wang, Ashok Kumar, Frederic McKenzie, Yaohang Li, and Jiang Li, "High-Dimensional MRI Data Analysis using a Large-Scale

Manifold Learning Approach," *Machine Vision and Applications*, Vol. 24, No. 5, 2013, pp 995-1014.

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