CURRICULUM VITAE and BIBLIOGRAPHY Thurmon E. Lockhart

Thurmon E. Lockhart, PhD, CPE
Professor
School of Biological and Health Systems Engineering, Ira A. Fulton Schools of Engineering, Arizona State University, Tempe
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DESCRIPTIVE VITAE

Dr. Lockhart is a Professor in the Biomedical Engineering program in the School of Biological Health and Systems Engineering at Arizona State University. He is also a Guest Professor at Ghent University in Belgium and, serves as a Research Affiliate Faculty at Mayo Clinic College of Medicine, Division of Endocrinology. Previously (2000-2014), Dr. Lockhart was a Professor at Virginia Tech, Industrial and Systems Engineering Department and, Virginia Tech/Wake Forest School of Biomedical Engineering and Science.

Professor Lockhart's research and publications concern the identification of injury mechanisms and quantification of sensorimotor deficits and movement disorders associated with aging and neurological disorders on fall accidents. His academic grounding in biomechanical modeling, nonlinear dynamics, human postural control, gait mechanics, and wearable biosensor design underscore a fundamental capacity to provide unique clinical solutions to injury preventions utilizing both engineering and biomedical principles. As a result of above initiatives, Dr. Lockhart has published 5 book chapters and more than 200 full-length manuscripts in a variety of journals and proceedings. Professor Lockhart was an Editor for Ergonomics (2010-2016) and is currently an Associate Editor of the *Annals of Biomedical Engineering* (Springer) and Editorial Board of the *Ergonomics* (Taylor & Francis), Academic Editor of the *Sensors,* and Board of Consulting Editors of the *Journal of Biomechanics* (Elsevier). Dr. Lockhart is the Editor-in-Chief for *Wearable Biomedical Systems* section *of* the newly created journal – *Sci.*

Professor Lockhart has worked on a number of research projects in the area of human locomotion, gait and posture, and wearable sensors. His efforts have involved contractual research and development from the National Science Foundation (NSF), CDC, NIH, National Institute of Occupational Safety and Health (NIOSH), Office of Naval Research (ONR), Department of Labor (DOL), Whitaker Foundation, Los Alamos National Laboratory, UPS, ITT and others. Additionally, collaboration with ITT in development of the new "Night-Vision" system in 2014 has led to the patent-8648897: A System and Method for Dynamically Enhancing Depth Perception in Head Borne Video Systems.

Dr. Lockhart has translated research findings into practice by reaching a significant number of external organizations and individuals. His outreach efforts have impacted several organizations including the UPS, Diageo, Los Alamos National Security, DOE, GE, BP, SnapOn Tools and the US Navy. In recognition of these scientific achievements, Dr. Lockhart and co-workers were awarded the Alexander C. Williams, Jr., Design Award from the Human Factors and Ergonomics Society in 2008. His research was recently featured on the PBS NOVA ScienceNow and Good Morning America programs, Fortune, AgingWell, Men's Health and Discover magazines.

1. Personal Information

Work Address: School of Biological and Health Systems Engineering
Ira A. Fulton Schools of Engineering
Arizona State University
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Tempe, AZ 85287-9709

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2. Present Academic Rank and Position

Professor – School of Biological and Health Systems Engineering, Ira A. Fulton Schools of Engineering, Arizona State University, Tempe, AZ — 08/2014 – Present

Guest Professor – Department of Industrial Management, Ghent University, Ghent, Belgium — 10/2008 – Present

Adjunct Professor –the Department of Neurobiology at Barrow Neurological Institute, Phoenix, AZ — 10/2014 – Present

Research Affiliate Professor –the Division of Endocrinology, College of Medicine, Mayo Clinic Arizona, Scottsdale, AZ — 03/2017 – Present

3. Education

Texas Tech, Lubbock, TX — 05/1992
BS, Industrial and Systems Engineering

Texas Tech, Lubbock, TX — 05/1997
MS, Industrial and Systems Engineering

Texas Tech, Lubbock, TX — 05/2000
PhD, Industrial and Systems Engineering

4. Certifications

Board Certifications

Board of Certification in Professional Ergonomics

Certified Professional Ergonomist (CPE#1138) — 2016 – Present

5. Honors/Awards

ARCS Scholar – Achievement Rewards for College Scientists — 1999

Special Emphasis Research Career Award (SERCA K01) – CDC/NIH — 2001

Faculty Affiliate Research Award – Virginia Tech Center for Gerontology — 2002

Dean's Award of Excellence for Outstanding Assistant Professor – VT — 2003

Biomedical Engineering Grant Investigator – The Whitaker Foundation — 2003

Best Paper Award – Liberty Mutual (Published in Ergonomics, 2003-2004) — 2005

Disability Research Award – Americans with Disabilities Act — 2007

Alexander C. William, Jr., Design Award – HFES Society — 2008

Faculty Fellow – College of Engineering, Virginia Tech — 2008

Dean's Award of Excellence in Research – Virginia Tech — 2013

Biomedical Engineering Society, Annals of Biomedical Engineering Editor Award — 2018

Biomedical Engineering Society, Annals of Biomedical Engineering Editor Award — 2019

6. Previous Professional Positions and Major Appointments

Assistant Professor – Grado Department of Industrial and Systems Engineering, Virginia Tech, Blacksburg, VA	08/2000 – 06/2006
Primary Faculty – Virginia Tech / Wake Forest School of Biomedical Engineering and Science, Blacksburg, VA	08/2002 – 07/2014
Associate Professor - Grado Department of Industrial and Systems Engineering, Virginia Tech, Blacksburg, VA	06/2006 – 06/2013
Professor - Grado Department of Industrial and Systems Engineering, Virginia Tech, Blacksburg, VA	06/2013 – 07/2014

7. Professional & Community Memberships, Societies and Services

Professional Memberships & Services

ASTM
- F-13 Standards Committee
  - Member — 2001

Australian Research Council (ARC)
- Discovery Projects
  - Member — 2002 – 2005
- Peer Review Panel
  - Member — 2002 – 2005

Biomedical Engineering Society, USA
- Editorial Member — 2010 – Present

Canada Foundation for Innovation
- Expert Committee
  - Member — 2016 – Present

CDC/NIOSH/NORA
- Evaluation of Slips and Fall Research
  - Peer Review Panel
    - Member — 2002
- Evaluation of Stilts on Walking Characteristics of Drywall Installation Tasks
  - Peer Review Panel
    - Member — 2003, 2009

EU Marie Curie ASSSTID Fellowship
- Selection Panel
  - Member — 2016 – Present

Health Research Council of New Zealand
- Review Panel
  - Member — 2008 – 2009

Human Factors and Ergonomics Society
- Accreditation Committee
  - Member — 2011 – Present
- Industrial Ergonomics – Technical Group
  - Chair — 2009 – 2010

Institute of Ergonomics and Human Factors, UK

Member	2004 – Present
Program Chair	06/2005
International Conference on Computer-Aided Ergonomics and Safety (CAES)	
Biomechanics of Slips and Falls	
Session Chair	08/2001
Special session on Slips and Falls	
Chair and Organizer	08/2001
International Ergonomics Association (IEA)	
Slips, Trips and Falls Symposium	
Chair and Organizer	08/2003
International Society of Occupational Ergonomics and Safety	
Conference Chair	06/2009
Executive Committee	
Treasurer	2004 – 2006
President	2008 – 2009
Program Chair	06/2005
Slips, Trips and Falls (STF) Symposium	
Chair and Organizer	06/2005
Korean-American Scientists and Engineers Association (KSEA)	
Southern VA Chapter	
President	2002
Mid-Eastern Alliance for Minority Participation (MEAMP)	
Advisor	2002 – Present
National Aeronautics and Space Administration (NASA)	
Sensorimotor Crew Health	
Peer Review Panel	
Member	2009 – 2010
National Institutes of Health	
Musculoskeletal Rehabilitation Sciences (MRS)	
Scientific Review Board	
Member	2010 – 2016
Netherlands Organisation for Health Research and Development (ZonMw)	
Member	2006 – 2007
Peer Review Panel	
Member	2006, 2009
Thailand International Scientific Advisory Board	
Member	2003
United States Department of Education (NIDRR)	
Review Committee	
Member	2007 – 2008

8. Journal Responsibilities

Journal Editorial Responsibilities

Annals of Biomedical Engineering (Springer)
Associate Editor 2010 – Present

Ergonomics (Taylor & Francis)
Editor 2010 – 2016
Editorial Board
Member 2016 – Present

Journal of Biomechanics (Elsevier)
Board of Consulting
Editor 2015 – Present

Sensors (MDPI)
Academic Editor 2016 – Present

Sensors (MDPI): Sci, Wearable Biomedical Systems
Editor-in-Chief 2018 – Present

9. Educational Activities

A. Curriculum/Course Development

BME 122 Statistics for Biomedical Engineers 2018

BME 598 Human Factors and Systems Design
Created new class content integrating disability research and HF methods
ASU

BME 494/598 Biomechanics/Human Physical Capability 2016-2017
Created new course incorporating traditional biomechanics and rehabilitation Engineering
ASU

State-of-the-art fall prevention training method
Developed and disseminated to various industries including the companies – UPS, Diageo and Los Alamos National Security

ISE 3014 – Work Measurement and Methods Engineering
Modified class content integrating the traditional work measurement techniques and state-of-are motion analysis system techniques.
Virginia Tech

ISE 4624 – Work Physiology.
Developed course materials incorporated physiology laboratory exercises to course practicum.
Virginia Tech

ISE 3614 – Introduction to Human Factors Engineering
Class content was modified to include in-class laboratory practice in assessing human attributes
Virginia Tech

ISE 5154 – Applied Human Factors Engineering
Developed class content to include human systems integration methods to examine designs and reliability of a system
Virginia Tech

ISE 5614 – Human Physical Capabilities
Developed Class contents including the bioinstrumentation section and signal processing modules for dynamic biomechanical modeling.
Virginia Tech

ISE 5605 and 5606 – Human Factors in System Design
Developed class content, implemented reading list of the current relevant journal articles, thus, adding current human factors evaluation and assessment methods
Virginia Tech

Established "Health Awareness" Program for Mentally Handicapped 2003 - Present
Extension Activities to reduce fall accidents among mentally handicapped individuals at Southwest Virginia Training Center
Hillsville, VA

ISE 5974 – Graduate Independent Study – Bioinstrumentation Methods 2004
Develop a Graduate Independent Study
Virginia Tech

ISE 6624 – Advanced Topics – Biomechanics of Human Locomotion 2007
New course development integrating theory and practices of gait analysis
Virginia Tech

B. Teaching Intramural

ISE 6624 – Advanced Topics – Biomechanics of Human Locomotion 2007
Virginia Tech

Guest Professor 2008 – Present
Belgium's First Industrial Engineering Graduate Program
Ghent University
Belgium

ISE 6624 – Advanced Topics – Biomechanics of Human Locomotion 2009
Virginia Tech

BME 182 – Biomedical Engineering Product Design II 2015 (Spring)
Undergraduate Students (100 students: Instructor Evaluation- 4.64/5)
Arizona State University
Tempe, AZ

BME 598 – Human Factors and Ergonomics 2015 (Fall)
Graduate Students (38 students: Instructor Evaluation – 4.47/5
Arizona State University
Tempe, AZ

BME 101 – Biomedical Engineering 2015 (Fall)
Undergraduate Students (17 students: Instructor Evaluation- 4.69/5)
Arizona State University
Tempe, AZ

BME 101 – Biomedical Engineering 2016 (Spring)
Undergraduate Students (15 students: Instructor Evaluation- 4.24/5)
Arizona State University
Tempe, AZ

BME 598 – Human Factors and Ergonomics 2016 (Fall)
Graduate Students (23 students: Instructor Evaluation – 4.31/5
Arizona State University
Tempe, AZ

BME 101 – Biomedical Engineering 2016 (Fall)
Undergraduate Students (15 students: Instructor Evaluation- 4.72/5)
Arizona State University
Tempe, AZ

C. Mentorship

DOCTORAL STUDENTS CHAIRED (Graduated)

Individual and Position	Timeframe & Description	Outcomes	Current Status
1. Davis, Thomas	01/2000 – 05/2002 ISE, Virginia Tech Funded by ARL PhD 05/2002	Publication - 3	Chief, Weapons Division, US Army Research Laboratory (ARL), Huntsville, AL
2. Kim, Sukwon	01/2006 – 05/2006 ISE, Virginia Tech Whitaker Foundation PhD 02006	Publications – 7	Professor, Kinesiology, Chungbuk National University (Korea)
3. Wen Shi	08/2005 – 5/2007 ISE, Virginia Tech Funded by CDC PhD 12/2007	Publications – 4	Bose Corporation, Framingham, MA
4. Liu, Jian	08/2008 – 09/2009 ISE, Virginia Tech Funded by NSF PhD 08/2008	Publications – 7	Associate Professor Industrial Engineering, Marshall University
5. Nantakrit, Yodpijit PhD	Ph.D. 08/2010, funded by NSF	Publications – 4	Associate Professor (Tenured),King Mongkut's University of Technology, North Bangkok, Thailand
6. Parijat, Prakriti	08/2010 – 10/2010 ISE, Virginia Tech Funded by CDC PhD 08/2010	Publications – 4	User Experience & Design Team, DBS Bank, Singapore
7. Selina Zhang, PhD	Ph.D. 05/2011, Funded by NSF, NIOSH	Publications – 4	iOS Location and Motion Engineer, Wireless Technologies, Apple Inc.
8. Jongprasithporn, Manutchanok	12/2011 – Present ISE, Virginia Tech Funded by NSF PhD 08/2011	Publications – 3 submitted	Assistant Professor ,Faculty of Engineering, King Mongkut's University, Bangkok, Thailand
9. Rahul Soangra	07/2017 Funded by NSF PhD 05/2014	Publication – 12	Assistant Professor, Department of Physical Therapy, Chapman University, Irvine, CA
10. Jian Zhang	05/2017 NIOSH, and NSF PhD 05/2014	Publication – 2	Ligra, San Jose, CA
11. Saba Rezvanian	PhD 05/2018, Funded by NSF	Publications – 4 submitted	University California San Diego

DOCTORAL STUDENTS (CURRENT, ASU)
1. Victoria Smith, MS (Chair: Ph.D. 2014-2019 - GRA) **–** Nonlinear dynamics methodology
2. Chris Frame, MS (Chair: Ph.D. 2015-2019 - GRA) – Effects of Dyskinesias on Postural Stability
3. Markey Olson (Chair: Ph.D. 2016 – 2020 – GRA) – DBS/PPN PD
4. Kaycee Glattke (Chair: Ph.D. 2017 – 2020 – GRA) – Resistance Intervention for Orthopedic patients
5. Seong Moom (Chair: Ph.D. 2018 – 2022 – GRA) – Activity analyses in movement disorders

MASTERS STUDENTS -Thesis (GRADUATED FROM VT and ASU)
1. Seong Moom (Chair: M.S. 2018, GRA) – Nonlinear analyses of Gait and Posture.
2. Tanavadee Khuvasanont (M.S., 2002): Industrial Ergonomics, Ministry of Labour, Thailand.
3. Jeremy Spaulding (M.S., 2003): Principle Human Factors Engineer, OSRAM SYLVANIA, Beverly MA.
4. Haruetai Mekaroonreung (M.S., 2003): Instructor (Non-tenure Track), Chulalongkorn University, Bangkok, Thailand.
5. Keith Bishop (M.S., 2003): Human Factors Engineer, Raytheon.
6. Jason Clark (M.S., 2004): Research Engineer, Jeppesen, Washington, DC, US.
7. Pankaj Raj (M.S., 2005): Microsoft, Usability Engineer, Issaquah, WA.
8. Monica Glumm (M.S., 2005): Researcher, US Army Research Laboratory.
9. Arka Gosh (M.S., 2005): Trader, Broadpoint Gleacher, NY, US.
10. Hyungnam Kim (M.S., 2005): Ph.D. Student, ISE-VT.
11. Sean Pedrick (M.S., 2011): Naval Surface Warfare Center, Dahlgren, VA.

Special Achievements Former Graduate Students
Thomas Davis (Ph.D.) – Modern-Day Technology Leader
Jian Liu (Ph.D.) – Top Three Finalist of Student Paper Competition, Human Factors and Ergonomic Society 2005.
Prakriti Parijat (M.S., Ph.D.) – Graduate Program Development Award, International Society of Occupational Ergonomics and Safety, June 2005, Las Vegas.
Prakriti Parijat (M.S., Ph.D.) – Best Paper, Student Paper Competition, Human Factors and Ergonomic Society 2008 IETG.
Courtney Haynes (M.S.) – ADA Disability Student Research Award (2008).
Xiouyue (Selina) Zhang – ICTAS Doctoral Fellowship (2007-2011).
Jeremy Spaulding – US Patent (US 2009/0248419 A1: Speech recognition adjustment based on manual interaction, 2009).
Jason Clark and Jeremy Spaulding – US patent (US 2008/0126091 A1: Voice dialing using a rejection reference, 2008).
Victoria Smith (ASU) – 2017, ARCS Scholar

MASTERS STUDENTS -Applied Project (ASU)
David Tze (Applied Project: 2016-2017) – Gait Instability monitor
Dale Franco Caagbay (Applied Project: 2016-2017) – Perturbation Training to reduce falls
Mark Huerta (Applied Project: 2014-2015) – Injury and Gait Speed
Andrew Quach (Applied Project: 2014-2015) – Sensory Feedback using Wearable System
Amanda Grzybowski (Applied Project: 2014-2015) – Postural Stability Assessment
John Templeton (MS Applied Project: 2015) – Physiologic response Monitor Integrated with a Mobile Application to Examine Potential Concussive Impacts

UNDERGRADUATE STUDENT PROJECT at ASU
Neema Jamali (2016-2017) – Concussion Preventative Sensor
Aaron Blank (2016-2017) – Concussion Preventative Sensor
Essang Akpan (2016-2017) – Concussion Preventative Sensor
Ojeen Korkes (2015-2016) – Orthotic device for Ataxic Gait Correction
Shang Ruan (2015-2016) – Orthotic device for Ataxic Gait Correction
Malik Alnaim (2015-2016) – Reducing tremors in Parkinson's Patients
Alexander Hoang (2015-2016) – Reducing tremors in Parkinson's Patients
Jake Turner (2015-2016) – Reducing tremors in Parkinson's Patients
Osama Wali (2015-2016) – Reducing tremors in Parkinson's Patients
Chase Fauer (2014-2015) – ASU Fitness Nutritional Tracker
John Templeton (2014-2015) – ASU Fitness Nutritional Tracker
Tim Seelig (2014-2015) - Wireless Data Transmitting Phil Dispensing Bottle Cap
Tyler Kunce (2014-2015) - Wireless Data Transmitting Phil Dispensing Bottle Cap
Tim Chakkaw (2014-2015) - Wireless Data Transmitting Phil Dispensing Bottle Cap
Chad Hyslop (2014-2015) - Wireless Data Transmitting Phil Dispensing Bottle Cap
Lisa Irimata (2014-2015) – Myoelectric Hand Orthotics
Dalton Moore (2014-2015) – Myoelectric Hand Orthotics
Jessica Schiltz (2014-2015) – Myoelectric Hand Orthotics

10. Institutional/Departmental Administrative Responsibilities, Committee Memberships and Other Activities

Activities at Other Institutions

Virginia Tech

Department of Industrial and Systems Engineering

M.S. Graduate Committee

Chairman 2002 – 2012

Ph.D. Graduate Committee

Chairman 2005 - 2014

Arizona State University

Chair of the ASU Senate committee (University Research and Creative Activities)	2018 - 2019
Chair of the ASU Senate committee (University Services and Facilities)	2017 - 2018
Member of the ASU Senate, Senator	2015 - present
Chair of the Personnel committee	2018 – present
Member of the Personnel Committee	2015 - 2018
Member of the BME Graduate Program Committee	2015 - present
Member of the Biological Design Graduate Program Committee	2015 - present

11. Presentations Extramural

National/International (INVITED)

Human Factors Research in Automobile Safety Toyota Motor Corporation, Toyota Shi, Japan	10/21/2003
Keynote Address: Ergonomics Programs in Academia King Mongkut's University, Bangkok, Thailand	09/15/2003
Role of Industrial Engineers as a Human Factors Specialist Keynote Presentation Prince of Songlka University, Thailand	09/17/2003
Ergonomics: Fall Safety Han Yang University, Seoul, Korea	8/16/2004
Keynote: Human Factors in Automotive Design Industrial Engineering Department Dong-Ha University, Seoul, Korea	03/15/2005
From Research to Reality – Occupational Fall Prevention Training Keynote Presentation, SAII, Industrial Engineering Conference, Puebla, Mexico	11/2007
Keynote Address 1st International Industrial Engineering Congress, UNAM, Mexico	09/2008
International Conference on Fall Prevention and Protection Morgantown, WV	05/2010
Kinetic Learning in Safety New Jersey State Safety Council's Occupational Safety and Health Conference	05/2011
The State of Science on Occupational Slips, Trips and Falls on the Same Level Proceedings of the International Conference on Fall Prevention and Protection National Institute of Occupational Safety and Health, Tokyo, Japan	2013
Local Dynamic Stability in Recently Concussed Athletes' Single and Dual-Task Gait. Biomedical Engineering Society Annual Meeting, Tampa, FL	10/2015

Regional: Invited

WearRAcon: Adaptability and complexity in fall safety	Feb 10, 2016
Arizona Geriatrics Society (Fall Symposium 2016): Chaos in Fall Prevention	Nov 11, 2016
Arizona Self-Insurers Association: Kinetic Learning in Occupational Fall Safety	Oct 13, 2016
University of Oregon: Fall Accidents Among the Elderly	Oct 6, 2016

12. Research Interests

Fall risk prediction and assessments

Gait and posture, postural control, and nonlinear dynamics

Wireless wearable sensors for continuous, non-invasive gait monitoring to accurately detect and study fall events and predict future falls in the elderly population

Interventions (nutrition/exercise) to reduce falls in older adults

Occupational fall prevention training

Biomechanics of human locomotion, occupational biomechanics

Ergonomics and human factors, design of experiments

International Research Collaborations:

1. Collaborated with Toyota Motor Corporations in Japan for four years (2001-2005) and established international ergonomics standard for Intelligent Transportation System for elderly populations.
2. Established research partnership with Dr. Dirk Van Goubergen (2002-present) in Belgium - resulted in one journal publication and one book chapter.
3. Established research partnership with the scientists from Sweden to establish worldwide definition of “mobility” for the elderly leading to the International Standard of Mobility (2003-ongoing).
4. Established research partnership with Dr. Hoon Yong Yoon, at the Dong-A University, Dr. Sung Ha Park, at the Hannam University, and Dr. Min-Yong Park at the Hanyang University, Korea – resulted in two journal publications (2008).

13. Educational Practice, Interests, and Accomplishments

International Activities:

1. Participant of Thailand Government Job Safety Program (Summer, 2003)
2. Guest Professor at the Ghent University, Belgium (2008-present). Being the first graduate program in Industrial Engineering in Belgium, I am excited to disseminate the Ergonomics principles to the professional students in Belgium classrooms offering a three hour Human Factors and Ergonomics course per year.

What will the Future be Like? Nova Science Now, Aired on PBS (https://www.pbs.org/wgbh/nova/video/what-will-the-future-be-like)

14. Research Grants Awarded

Active

Co-Principal Investigator	Michael J. Fox Foundation: Protective Step Training in People with PD and Postural Disturbances. (PI: Dan Peterson, CoPIs: Thurmon Lockhart) ($409,007)	11/01/2018–10/31/2022
Co-Principal Investigator	NSF-1840396: Planning Grant: Engineering Research Center for Aging-centric Engineering Technologies. (PI: Balaji Narasimhan, CoPIs: Thurmon Lockhart, Ramesh Jain, Christopher Hertzog, and Jennifer Margrett. NSF-EEC Div of Eng Education and Centers. ($98,385)	09/01/2018–08/31/2019
Principal Investigator	Effects of L-DOPS on Falls in Patients with Neurogenic Orthostatic Hypotension (NOH). Lundbeck PI (ASU): Lockhart and PI (BNI): Lieberman. This study will for the first time test a drug that can mitigate syncopal falls in the elderly ($273,482-BNI, ASU-$65,373))	06/15/2018 – 04/25/2020

Principal Investigator	Effects of L-DOPS on Gait and Postural Stability. Lundbeck. PI (ASU): Lockhart and PI (BNI): Lieberman. The primary objective of this study is to assess the mechanisms leading to falls reduction observed in previous studies using L-DOPS treatment by PD patients with neurogenic orthostatic hypotension (NOH). ($174,355)	01/2018 – 12/2020
Principal Investigator	BRAIN Project: Custom Designed Wearable Sensor System for Fall Risk Assessment. ASU:C Building Reliable Adv Innovation Neurotech (BRAIN).	08/14/2017– 05/31/2020

Completed

Principal Investigator	Effects of Vitamin D3 on Muscle Function, Stability, Gait and Activity in Assisted Living Patients. $216,000.	08/2015 – 07/2017
Principal Investigator	Abbott-Effects of Vitamin D3 Supplementation on Dynamic Stability: Abbott Nutrition. This grant will support the study of nutritional supplementation on the risk of fall among the community dwelling elderly ($122,250)	07/2015 – 06/2018
Principal Investigator	DSM – Effects of Vitamin D3 Supplementation on Dynamic Stability: DSM. This is an international grant support the Abbott research with EU interests in reducing the risk of fall among the community dwelling elderly ($108,249)	07/2015 – 06/2018
Principal Investigator	Effects of Aging and Load Carrying on Slip-Induced Fall Accidents. The Johns Hopkins NIOSH Education Research Center ($7,000).	03/2003 – 02/2004
Principal Investigator	Assessment of Age-Related Visual and Auditory Warning Design: Perceived Urgency and Criticality. Toyota Motor Corporation (Japan). ($119,725) PI – 80%, $95,780, Co-PI: Casali	05/2003 – 03/2004
Principal Investigator	Effects of Aging on the Biomechanics of Slips and Falls. Special Emphasis Research Career Award (SERCA-K01): (CDC) NIH/NIOSH, 1 K01 OH07450-01 ($162,000).	07/2001 – 06/2004
Principal Investigator	Dynamic Visual Performance of Elderly Drivers. Toyota Motor Corporation. ($95,724).	05/2004 – 03/2005
Principal Investigator	Clinical Evaluation of Low Resistant Machines on Biomechanical Response. Virginia's Philpott Manufacturing Extension Partnership – VPMEP. ($4,946).	01/2005 – 05/2005
Principal Investigator	Effects of Flat or Fabricated Glass Articles on Occupant Vision in Vehicles. PPG Industries, Inc. ($15,000).	01/2005 – 05/2005
Principal Investigator	An Electronic Textile System for Gait Analysis. NSF/SBIR – Virginia Electronic Textile Systems, LLC. ($33,000).	01/2005 – 05/2005
Principal Investigator	Evaluation of Anti-Glare Items on Visual Performance of the Elderly. Toyota Motor Corporation ($88,116)	06/2005 – 03/2006
Co-Investigator	Occupational Safety and Health Training. CDC/NIOSH (Lockhart Co-I – 10% $28,143, Nussbaum PI – 90% $281,434).	07/2001 – 06/2006
Principal Investigator	Biomechanical Analysis of Slip-Induced Falls. The Whitaker Foundation ($210,738).	09/2003 – 08/2006

Principal Investigator	Age-Related Effects of Work-Pace and Load Carrying on Risk of Slip Initiation. The Johns Hopkins NIOSH Education and Research Center ($10,000).	01/2005 – 12/2006
Co-Investigator	VT Post Baccalaureate Research and Education Program. NIH (1R25 GM066534-01A1: $1,915,354) PI; Smith; Co-I (Mentor) 5% $95,767.	06/2003 – 05/2008
Co-Principal Investigator	Systems Safety Approach for Driver Competency and Safety Training for UPS Driver Delivery Providers. United Parcel Service – DOL. PI: Smith-Jackson. $450,000 (Co-PI 11.11%: $49,500).	06/2006 – 5/2008
Principal Investigator	Development and Testing of a Fall Arresting System. University of Kentucky and Four Season Roofing. ($44,338).	06/2007 – 05/2008
Principal Investigator	Orthotics Fall Intervention for Older Adults. VCOM/Harvey Peters Foundation ($50,000).	03/2007 – 06/2008
Principal Investigator	Kinetic Learning Module for Training DSPS. United Parcel Service ($16,505).	04/2007 – 06/2008
Principal Investigator	Non-Intrusive Locomotion and Gait Stability Analysis Monitoring System for the Elderly. NIH/NIA – 1R43AG029721 ($99,771) PI: Saxena [AFrame], VT-PI: Lockhart (100%).	09/2007 – 08/2008
Principal Investigator	Hyperstereopsis Digital Compensation Mechanisms. ITT Night Vision – 082301. ($298,153 – VT-PI: Lockhart 75%: $223,614), Riverstone PI: Inge.	04/2008 – 08/2008
Co-Principal Investigator	Older Driver Naturalistic Observation. Virginia Tech Transportation Institute – VTTI. $280,000. PI: Antin, Co-PI – Lockhart (25%) $70,000.	05/2007 – 04/2009
Co-Principal Investigator	Meeting Mandated Manning Requirements Through Effort Leveling. Office of Naval Research (ONR), MCM System for Combat Ship Advanced Flight Mission. $937,265. PI: Sturges. Co-PI: Lockhart (50%) $468,633.	12/2007 – 12/2009
Co-Investigator	VT Initiative fo r Maximizing Student Diversity. NIH (1R25 GM072767-01A2). $1,607,467. PI: Smith. Co-I: Lockhart (Mentor) 5%: $80,373.	01/2007 – 12/2010
Principal Investigator	Continuous Non-Invasive Gait Analysis and Fall-Risk Assessment. NSF-CBET-0756058. ($450,000). VT-PI: Lockhart (100%) $225,000.	04/2008 – 03/2011
Co-Principal Investigator	Roboust Dexterous RMMV Tasks. Office of Naval Research (ONR), MCM Advanced Flight Mission Package Program. $745,446. PI: Sturges. Co-PI: Lockhart (50%) $372,723.	01/2010 – 05/2011
Co-Investigator	Occupational Safety and Health Training Grant. NIOSH-T01 OH008613. $344,340. PI: Nussbaum. Co-I's: Casali, Kleiner, Lockhart, Smith-Jackson, Winchester (4%) $13,773	07/2006 – 06/2011
Principal Investigator	Slip Simulators: Design and Application. Los Alamos National Security – 102733-001-10. $43,914	08/2010 – 09/2012
Principal Investigator	Low Cost Gait and Frailty Assessment on Smartphone Platforms. NSF-Corps-1343079. $50,000	07/2013 – 01/2014

Principal Investigator	NSF REU Supplement. SHB: Medium Collaborative Research: Non-Intrusive Multi-Patient Fall-Risk Monitoring in Health Care Facilities. PI: Lockhart – 50%; Ha – 50% ($82,000).	08/2012 – 07/2015
Principal Investigator	Smart and Connected Health (SCH) PI and Aspiring PI Meeting 2015: NSF-PI: Lockhart. This is a grant to gather wearable biosensor community to help the next generation of researchers in the biosensor area. $99,392	04/2015 – 03/2016
Co-Principal Investigator	Safety and Ergonomics Training. NIOSH. PI: MA Nussbaum (36%); Co-I's: MJ Agnew (5%), JG Casali (5%), B Kleiner (3%), T Lockhart (3%: $14,121), T Smith-Jackson (25%), and D Young (20%). $470,703.	07/2011 – 06/2016
Principal Investigator	NSF- Information and Intelligent Systems (IIS) and Smart Health and Wellbeing -1065442 and 1065262 ($1,200,000: 8/01/2011 to 7/31/2017) PI: Lockhart (65%: $750,000) CoPI: Lach Co-I: Roberto and Ha	08/2011 – 07/2017

15. Patents

Title	Patent Number	Date filed	Date issued
Hip Inflatable Protection Bag (HIP-Bag) U.S. Patent Application: 06/601, 108, 11/202,357			
A System and Method for Dynamically Enhancing Depth Perception in Head Borne Video Systems. US: 12/861,988. PCT International Application: PCT/US2011/048889		08/26/2010-RatnerPrestia	
PRE PATENT DISCLOSURE: IMMU System Development, VTIP Disclosure No.: 07-075			

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112. Victoria A. Smith, Christopher W. Frames, Markey C. Olson, Thurmon E. Lockhart, Abraham Lieberman. "No Postural Stability differences between Asymptomatic and Symptomatic Neurological Orthostatic Hypotension in Parkinson's disease – A Pilot Study." American Academy of Neurology Annual Meeting, Los Angelos, CA, April 2018, poster.

113. "Effect of NP002, a centrally acting cholinergic agent, in reducing dyskinesia, freezing of gait, and falls in patients with Parkinson's disease" has been accepted for a platform presentation at the American Academy of Neurology 70th Annual Meeting, April 21 to April 27, 2018 in Los Angeles,

CA. The platform presentation number is 007 and will be presented during Session S26: Movement Disorders: Parkinson's Disease Clinical Trials on April 24, 2018 at 4:42 PM.

114. "**Characterizing Types of Falls in Parkinson's Disease**" has been accepted for a **poster presentation** at the American Academy of Neurology 70th Annual Meeting, April 21 to April 27, 2018 in Los Angeles, CA. **Poster Session P2-72** on **April 23, 2018**. Posters are on display all day from 11:30 a.m. to 7:00 p.m.

115. Roman, G., Vidt, M.E., Peterson, D., and Lockhart, T. Composite injury risk measure for sign language users. International Society of Biomechanics, International Shoulder Group (podium). Rochester, MN; August 2018.

116. Victoria A. Smith, Christopher W. Frames, Jakub Godzik, MD, Jay D. Turner, and Thurmon Lockhart. “Evaluating the Severity of Adult Spinal Deformity using Timed-Up and Go.” American Society of Biomechanics Annual Meeting, Rochester, MN, USA, August 2018, podium.

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