CURRICULUM VITAE

**Thurmon E. Lockhart, PhD, CPE**

**Professor/MORE Foundation Professor of Life in Motion**

School of Biological and Health Systems Engineering, Ira A. Fulton Schools of Engineering, Arizona State University, Tempe

E-mail address: thurmon.lockhart@asu.edu

Dr. Lockhart is the Inaugural MORE Foundation Professor of Life in Motion 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](http://www.ncbi.nlm.nih.gov/pubmed/?term=thurmon+lockhart) 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 3 edited books on "Sensors for Gait and Posture" and 2 textbooks (Biomechanics for Biomedical Engineers: ISBN 9781792456053 and, An Introduction to Statistics for Biomedical Engineers:  ISBN 9781792445453) 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](http://www.springer.com/biomed/journal/10439) (Springer Nature) and Editorial Board of the [Ergonomics](http://www.tandfonline.com/toc/terg20/current#.VGzowWotCCQ) (Taylor & Francis), and Research Reports (Springer Nature), Academic Editor of the [*Sensors*](http://www.mdpi.com/journal/sensors/editors)*,* and Board of Consulting Editors of the *Journal of Biomechanics* (Elsevier). Dr. Lockhart is theSection Editor for *Wearable Biomedical Systems* section in the Sensors (MDPI).

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. More recently, WO2023/064685 A1: Methods, Systems, and Computer Readable Media for Detecting Neurological and/or Physical Conditions, April, 20, 2023.

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 Amazon, UPS, Diageo, Los Alamos National Security, DOE, GE, BP, 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 Science Now and Good Morning America programs, Fortune, AgingWell, Men’s Health and Discover magazines.

**1. Personal Information**

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| Work Address: | School of Biological and Health Systems EngineeringIra A. Fulton Schools of EngineeringArizona State UniversityP.O. Box 879709Tempe, AZ 85287-9709 |
| Email Address: | Thurmon.lockhart@asu.edu |
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**2. Present Academic Rank and Position**

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| --- | --- |
| **MORE Foundation Professor of Life in Motion Professor** – School of Biological and Health Systems Engineering, Ira A. Fulton Schools of Engineering, Arizona State University, Tempe, AZ**Professor** – School of Biological and Health Systems Engineering, Ira A. Fulton Schools of Engineering, Arizona State University, Tempe, AZ | 07/2021 – Present08/2014 – Present |
| **Guest Professor** – Department of Industrial Management, Ghent University, Ghent, Belgium | 10/2008 – Present  |

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| **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**

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| --- | --- |
| Texas Tech, Lubbock, TXBS, Industrial and Systems Engineering | 05/1992 |
| Texas Tech, Lubbock, TXMS, Industrial and Systems Engineering | 05/1997 |
| Texas Tech, Lubbock, TXPhD, Industrial and Systems Engineering | 05/2000 |

**4. Certifications**

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| **Board of Certification in Professional Ergonomics** |  |
| Certified Professional Ergonomist (CPE#1138) | 2016 – Present  |

**5. Honors/Awards**

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| **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** | 2018-2023 |

**6. Previous Professional Positions and Major Appointments**

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| --- | --- |
| **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**

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| **Professional Memberships & Services** |  |
| ASTM F-13 Standards Committee Member | 2001 |
| Australian Research Council (ARC) |  |
| Discovery Projects Peer Review Member | 2002 – 2005  |
| Biomedical Engineering Society, USA |  |
| Editorial Board Member | 2010 – Present  |
| Canada Foundation for Innovation |  |
| Expert Committee Member | 2016 – Present |
| EU Marie Curie ASSSTID Fellowship |  |
| Selection Panel Member | 2016 – Present |
| Health Research Council of New Zealand |  |
| Review Panel Member | 2008 – 2009 |
| 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 | 2009 – 2010 |
| National Institutes of Health (NIH) |  |
| Musculoskeletal Rehabilitation Sciences (MRS) |  |
| Scientific Review Board Member | 2010 – 2016 |
| Netherlands Organisation for Health Research and Development (ZonMw) |  |
| Member Peer Review Panel Member | 2006 – 2007  |
| United States Department of Education (NIDRR) |  |
| Review Committee Member | 2007 – 2008 |

**8. Journal Responsibilities**

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| **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): Wearable Biomedical Systems |  |
| Guest Editor | 2018 – Present  |

**9. Mentorship**

**DOCTORAL STUDENTS CHAIRED (Graduated)**

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| **Individual and Position** | **Timeframe & Description** | **Outcomes** | **Current Status** |
| 1. Davis, Thomas | 01/2000 – 05/2002ISE, Virginia TechFunded by ARLPhD 05/2002 | Publication - 3 | Chief, Weapons Division, US Army Research Laboratory (ARL), Huntsville, AL |
| 2. Kim, Sukwon | 01/2006 – 05/2006ISE, Virginia Tech Whitaker Foundation PhD 02006 | Publications – 7 | Professor, Kinesiology, Chungbuk National University (Korea) |
| 3. Wen Shi | 08/2005 – 5/2007ISE, Virginia Tech Funded by CDCPhD 12/2007 | Publications – 4 | Bose Corporation,Framingham, MA |
| 4. Liu, Jian | 08/2008 – 09/2009ISE, Virginia Tech Funded by NSFPhD 08/2008 | Publications – 7 | Associate Professor Industrial Engineering, Marshall University |
| 5. Nantakrit, Yodpijit | 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 – 10/2010ISE, Virginia Tech Funded by CDCPhD 08/2010 | Publications – 4 | User Experience & Design Team, DBS Bank, Singapore  |
| 7. Selina Zhang | 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 TechFunded by NSFPhD 08/2011 | Publications – 3 submitted | Assistant Professor ,Faculty of Engineering, King Mongkut’s University, Bangkok, Thailand |
| 9. Rahul Soangra | 07/2017Funded by NSFPhD 05/2014 | Publication – 12 | Assistant Professor, Department of Physical Therapy, Chapman University, Irvine, CA |
| 10. Jian Zhang | 05/2017NIOSH, and NSFPhD 05/2014 | Publication – 2 | Ligra, San Jose, CA |
| 11. Saba Rezvanian | PhD 05/2018,Funded by NSF | Publications – 4 submitted | University California San Diego |
| 12. Victoria Smith | PhD 05/2019 | Publications - 4 | Force Impact Technologies Inc. |
| 13. Kaycee Glattke | PhD 05/2022 | Publications -3 | Mayo Clinic  |
| 14. Seong H. Moom | PhD 12/2023 | Publications -3 | Mayo Clinic  |

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| **DOCTORAL STUDENTS (CURRENT, ASU)** |
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| 1. Chris Frame, MS (Chair: Ph.D. 2015-2019 - GRA) – Effects of Dyskinesias on Postural Stability
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| 1. Markey Olson (Chair: Ph.D. 2016 – 2020 – GRA) – DBS/PPN PD
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| **MASTERS STUDENTS -Thesis ( GRADUATED FROM VT and ASU)** |
| 1. William Sweeten (Chair: M.S. 2022, GRA) – Graphene and gait analyse.
2. Seong Moom (Chair: M.S. 2018, GRA) – Nonlinear analyses of Gait and Posture.
 |
| 1. Tanavadee Khuvasanont (M.S., 2002): Industrial Ergonomics, Ministry of Labour, Thailand.
 |
| 1. Jeremy Spaulding (M.S., 2003): Principle Human Factors Engineer, OSRAM SYLVANIA, Beverly MA.
 |
| 1. Haruetai Mekaroonreung (M.S., 2003): Instructor (Non-tenure Track), Chulalongkorn University, Bangkok, Thailand.
 |
| 1. Keith Bishop (M.S., 2003): Human Factors Engineer, Raytheon.
 |
| 1. Jason Clark (M.S., 2004): Research Engineer, Jeppesen, Washington, DC, US.
 |
| 1. Pankaj Raj (M.S., 2005): Microsoft, Usability Engineer, Issaquah, WA.
 |
| 1. Monica Glumm (M.S., 2005): Researcher, US Army Research Laboratory.
 |
| 1. Arka Gosh (M.S., 2005): Trader, Broadpoint Gleacher, NY, US.
 |
| 1. Hyungnam Kim (M.S., 2005): Ph.D. Student, ISE-VT.
 |
| 1. Sean Pedrick (M.S., 2011): Naval Surface Warfare Center, Dahlgren, VA.
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| **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  |

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| **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 |

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| **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 |
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| 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 |
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| Chase Fauer (2014-2015) – ASU Fitness Nutritional Tracker |
| John Templeton (2014-2015) – ASU Fitness Nutritional Tracker |
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| 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 |
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| 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**

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| **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 |

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| 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 - 2021 |
| Chair of the Personnel committeeMember of the Personnel Committee  | 2018 – present2015 - 2018 -2020 |
| Member of the BME Graduate Program Committee | 2015 - 2020 |
| Member of the Biological Design Graduate Program Committee | 2015 - present |

**11. Presentations Extramural**

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| **National/International (INVITED)** |  |
| Human Factors Research in Automobile SafetyToyota Motor Corporation, Toyota Shi, Japan | 10/21/2003 |
| Keynote Address: Ergonomics Programs in AcademiaKing Mongkut’s University, Bangkok, Thailand | 09/15/2003 |
| Role of Industrial Engineers as a Human Factors SpecialistKeynote PresentationPrince of Songlka University, Thailand | 09/17/2003 |
| Ergonomics: Fall SafetyHan Yang University, Seoul, Korea | 8/16/2004 |
| Keynote: Human Factors in Automotive DesignIndustrial Engineering DepartmentDong-Ha University, Seoul, Korea | 03/15/2005 |
| From Research to Reality – Occupational Fall Prevention TrainingKeynote Presentation, SAII, Industrial Engineering Conference, Puebla, Mexico | 11/2007 |
| Keynote Address1st International Industrial Engineering Congress, UNAM, Mexico | 09/2008 |
| International Conference on Fall Prevention and ProtectionMorgantown, WV | 05/2010 |
| Kinetic Learning in SafetyNew 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 LevelProceedings of the International Conference on Fall Prevention and ProtectionNational 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 |

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| **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**

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| 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).
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**13. Educational Practice, Interests, and Accomplishments**

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| 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.
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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**

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| Principal Investigator | NSF/BRAIN CORE Institute: Development and validation of Graphene biomaterials for biosensor applications. (PI: Thurmon Lockhart) ($50K)  | 08/01/2022– 12/30/2024 |
| Principal Investigator | NSF/BRAIN: Movement Interactive: Developing Fall Detection Tools for senior living facilities. (PI: Thurmon Lockhart) ($75K)  | 08/01/2022– 12/30/2024 |

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| Principal Investigator | Consumer Product Safety Commission: Adult Bathing Surface Standards Development. (PI: Thurmon Lockhart) ($340,667, 0.5M) | 10/01/2020– 09/30/2023 |
| Principal Investigator | NSF: Center for Building Reliable Advances and Innovations in Neurotechnology (BRAIN): BRAIN Project: Effects of Acute Low Back Pain Spinal Injection on Activities. (PI: Thurmon Lockhart) ($70K, 0.5M) | 5/01/2021– 8/31/2022 |
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| Principal Investigator | Google Inc: Fall Motion Data. (PI: Thurmon Lockhart) ($174,749, 0.2M) | 10/01/2020– 09/30/2022 |

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| Principal Investigator | EXOS: Fall Motion Data Collection. (PI: Thurmon Lockhart) ($45K) | 9/01/2020– 10/31/2023 |

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| Principal Investigator | Partnership for Economic Innovation (AZPEI): Wearable Fall Risk Assessment System. (PI: Thurmon Lockhart) ($77,642) | 9/01/2020– 12/31/2023 |

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| 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 |
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| 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 – 06/15/2021 |
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**Completed**

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| 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  |
| 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 |

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| Principal Investigator | ASU: Center for Building Reliable Advances and Innovations in Neurotechnology (BRAIN)BRAIN Project: Fractal rhythm of heart: Effects of physical intensities on balance related concussion measure. (PI: Thurmon Lockhart) ($50K) | 501/2020– 8/31/2021 |

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| Principal Investigator | BRAIN Project: Custom Designed Wearable Sensor System for Fall Risk Assessment. ASU:C Building Reliable Adv Innovation Neurotech (BRAIN). ($50K) | 08/14/2017– 05/31/2020 |
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**15. Patents**

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| **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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48. "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.
49. "**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.
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