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Professional Objectives: To apply engineering/biomechanics knowledge to further high quality research, advance educational value, and improve patient outcomes through superior medical devices, surgical techniques, and rehabilitation monitoring solutions.

EDUCATION EXPERIENCE

Dartmouth College, Thayer School of Engineering – Hanover, New Hampshire **03/2015 – 07/2018**

- Ph.D. in Engineering Sciences with focus in Biomedical Engineering
- Dissertation – *From Inertial Measurement Units (IMUs) to Physical Therapy (PT): The Use of Patient Biomechanics to Inform PT Prescription*.
- Research Associate – Dartmouth Biomedical Engineering Center (DBEC) and Orthopaedic Biomaterials Laboratory (OBL)
- 2019 Thayer School of Engineering Student Commencement Speaker
- Member – Orthopaedic Research Society (ORS)
- Member – American Society of Biomechanics (ASB)
- Member – Sigma Xi, The Scientific Research Society Dartmouth College Chapter
- Journal Reviewer – International Journal "The Knee"
- Journal Reviewer – International Journal "Applied Biomechanics"
- Journal Reviewer – International Journal "Journal of Biomechanics"
- Journal Reviewer – International Journal "ASME Journal of Biomechanical Engineering"
- Journal Reviewer – International Journal "Hip International"
- Journal Reviewer – International Journal "The Journal of Shoulder and Elbow Surgery"
- Grant Reviewer – New England Pediatric Device Consortium (NEPDC)
- Grant Reviewer – Center for Translation of Rehabilitation Engineering Advances and Technology (TREAT)
- Student Committee Member – Faculty at Large, MS/PhD Committee
- Student Representative – Faculty Searches
- Thayer School Tour Guide

The University of Iowa – Iowa City, Iowa **08/2011 – 05/2013**

- M.S. in Biomedical Engineering, Cumulative GPA: 3.80
- Thesis –*The effect of transcranial direct current stimulation on the behavioral and neurophysiological performance of healthy subjects during reaching.* Available via: http://ir.uiowa.edu/etd/2455/
- Research Associate – University of Iowa, Carver College of Medicine Department of Physical Therapy Neural Control of Movement Laboratory

The University of St. Thomas – St. Paul, Minnesota **08/2005 – 05/2010**

- B.S. in Electrical Engineering, Cum Laude, Cumulative GPA: 3.54
- Senior Design Project – Seed Potato Cooling Unit in Borko, Mali

ENGINEERING EXPERIENCE

Lecturing Professor – Dartmouth College **03/2020 – Present**

- Responsible for curricular development and dissemination of multiple course
- Successfully transitioned coursework (ENGS 165/ENGS 21) to online platform during global coronavirus pandemic of 2020 (COVID-19) to accommodate requirements of remote course instruction

- Further developed and taught graduate level Biomaterials (ENGS 165)
- Implemented core undergraduate curricular requirement Introduction to Engineering Design (ENGS 21)
- Implemented distribution of prototyping kits for remote learning including basic tools through complex machining processes
- Responsible for engineering and non-engineering majors (e.g. human centered design, studio arts)
- Participated in several committees vital to the success of the Thayer School of Engineering

Postdoctoral Research Associate – Dartmouth College **07/2018 – Present**

- Initiated collaborative efforts with the Department of Obstetrics and Gynecology at Dartmouth Hitchcock Medical Center assessing connections between pelvis biomechanics throughout pregnancy, labor, and delivery with clinical outcomes and maternal activity levels during pregnancy with clinical outcomes
- Created collaborative opportunities between Thayer School of Engineering and Dartmouth College Department of Athletics assessing Division 1 student-athlete injury risk, prevention, and treatment
- Mentored a student through an independent project in collaboration with Nike to develop a custom footwear design that is easier to don for a high-school student-athlete with cerebral palsy
- Utilized inertial measurement units to investigate pre- and post-operative biomechanics outside of the laboratory
- Assessed impact of PT on post-total knee arthroplasty outcomes via inertial measurement units
- Established pre- and post-total/reverse shoulder arthroplasty biomechanics via inertial measurement units
- Developed method for capturing cervical spine biomechanics outside of well-controlled environments with inertial measures
- Developed and validated activity classifier machine learning algorithms via inertial measurement units
- Created innovative collaborations with athletics and obstetrics departments
- Mentored undergraduate students through biomechanics projects (see mentorship below)
- Taught biomechanics courses (Musculoskeletal Biomechanics)
- Taught biomaterials course

Research Associate, TREAT Fellow – Dartmouth College **07/2014 – 07/2018**

- Created line of telemedicine research to analyze in-vivo kinematics of healthy and patient populations (patent issued)
- Developed new measurement technique for assessing 3D alignment of total knee arthroplasty components (patent pending)
- Analyzed retrieved orthopaedic devices for failure modes and mechanisms
- Generated and implemented FEA techniques on a variety of implantable orthopaedic devices
- Aided clients in commercializing medical rehabilitation and assistive technology devices

Sr. Research Specialist – University of Virginia SPEED Clinic **06/2013 – 07/2014**

- Created custom programs to analyze the kinematics and kinetics of golfers and runners via Vicon/AMTI motion capture
- Created individualized training programs for golfers and runners
- Maintained all hardware, software, and other equipment in the SPEED Clinic

Graduate Assistant – U of Iowa Neural Control of Movement Laboratory **08/2011 – 05/2013**

- Designed and executed experiments in Neural Control of Movement Lab
- Created MATLAB program to analyze kinematics and EMG of human reaching performance
- Analyzed kinematic, motion, EMG and statistical data of humans during walking and reaching

Lead Design Engineer – Chapman Innovations, LLC. **05/2012 – Present**

- Developed stationary/adjustable infant chairs to improve leg function in infants with neuromuscular dysfunction

Engineering Intern – Winkley Prosthetics Prosthetic Design **06/2012 – 08/2012**
- Conceptualized new designs for Syme's feet and cycling arm prostheses via 3D drawings using AutoCAD

Engineering Design Consultant – Eagle Eye Digital Video **10/2010 – 01/2011**
- Led design team to update track and field fully automated timing system to meet new NCAA and IAAF standards
- Consulted company executives to assess feasibility and design specifications

Senior Design Project – University of St. Thomas **08/2009 – 05/2010**
- Selected by USDA and Cargill to design and implement seed potato cooler for tribe in Borko, Mali
- Designed and developed energy supply system (solar panel array and generator backup) for seed potato cooler

Nike Design Consultant – Nike **06/2010 – 08/2011**
- Utilized Adobe Illustrator to design custom apparel, equipment, and footwear

TEACHING EXPERIENCE

Instructor – ENGS 21: Introduction to Engineering Design (Spring/Summer 2020)
- Responsible for successful implementation of core undergraduate engineering curricula
- Class flows from initial problem statement development through prototyping and final product design
- Responsible for developing overarching mission and assembling appropriate teams & review boards

Instructor – ENGS 165: Biomaterials (Spring 2020)
- Developed and implemented curricula for graduate level biomaterials course
- Responsible for content creation, lectures, and midterm/final project assessment
- Content spans the spectrum of introduction biomaterial properties through specific applications

Review Panel Board Member – ENGS 90: Engineering Design Methodology and Project Completion
- Review board member for final senior design capstone course presentation
- Assessed undergraduate senior projects in biotechnology and biomedical engineering space
- Projects ranged from developing novel antibody purification processes to rooms for children sensory processing challenges.

Review Panel Board Member – ENGM 178: Technology Assessment
- Review board member for Masters of Engineering Management (MEM) Technology Assessment course
- Evaluated MEM student assessments of proposed technologies
- Specific section entailed big data, wearable devices, and healthcare informatics

Co-Instructor – ENGG 192: Special Topics – Musculoskeletal Biomechanics
- Developed and implemented curricula for introductory musculoskeletal biomechanics course
- Created and presented lectures, produced weekly problem sets for biweekly pedagogical classroom based experiences
- Generated and implemented laboratory experiences using of a variety of biomechanics tools and methods (e.g. MOCAP)

Teaching Assistant – ENGS 31: Digital Electronics
Teaching Assistant – ENGS 32: Introduction to Linear and Digital Circuits
Teaching Assistant – ENGS 129: Biomedical Circuits and Systems
- Developed and implemented weekly laboratory experiences
- Evaluated student performance through homework problem sets, laboratories, and exams

Guest Lecturer – ENGS 165: Biomaterials
Guest Lecturer – DPT 6060: Pediatrics at St. Catherine University
Guest Lecturer – PHYS 362: Materials Engineering and Nanoscience at St. Olaf College

- Instructed students on how biomechanics impacts orthopaedic biomaterials design decisions
- Provided content expertise on upper/lower extremity biomechanics and total joint arthroplasty
- Disseminated motion capture method information to PT students
- Discussed the patient impact of biomaterials from engineering choices with undergraduate physics students

MENTORSHIP EXPERIENCE

Faculty Advisor – ENGS 21: Introduction to Engineering
Faculty Advisor – ENGS 75: Product Design
Faculty Advisor – ENGS 89/90: Engineering Design Methodology and Project Initiation/Completion

- Provided research and design feedback to student groups on final product design projects
- Provided content expertise and assisted in design decisions for groups in the biomedical/biotech space
- Aided students through the development process of a novel prone bicycle
- Advised students on the improvement of a soft ankle foot orthosis device
- Advised/mentored students on development of a fetal monitoring system during labor and delivery

Course Mentor – ENGS 33: Solid Mechanics

- Judged objective and subjective criterion for final bridge building competition

Special Project Mentor – Women in Science Projects (WISP)

- Annual mentor for up to 4 first-year research interns
- Assisted in development, implementation, and evaluation of experimental design in orthopaedics projects

Special Project Mentor – Sophomore Scholar
Special Project Mentor – Presidential Scholar

- Mentored eligible sophomore, junior, and senior students from research grant application through project completion
- Established novel method for remotely monitoring spinal biomechanics during remote trauma patient evacuation
- Developed and validated method for establishing activity classification via inertial measures

Special Project Mentor – Senior Honors Theses

- Mentored senior studies through selected senior honors thesis projects
- Guided selected students from project ideation, experimental execution, and scientific writing

Special Project Mentor – Junior Solar Sprint

- Led setup and tear down of competition venue
- Judged objective and subjective criterion for annual model solar car competition for middle school students

Special Project Mentor – Dartmouth Formula Hybrid

- Planned and executed end of year barbecue for annual Formula Hybrid competition
- Managed team of ten individuals responsible for planning and implementation of end of year barbecue

AWARDS

- The Neukom Institute for Computational Science 1st Place Neukom Prize for Undergraduate Research 2020 – $1000. Awarded to the most outstanding undergraduate researcher each year conducting research in computational sciences. McCabe, MV (Senior Honor's Thesis). *Utilizing neural networks and wearables to quantify hip joint angles and moments during walking and stair ascent*. Faculty Advisor: **Ryan Chapman**
- International Society for Technology in Arthroplasty Young Investigator Travel Award – $300. Awarded for travel to the International Society for Technology in Arthroplasty Annual Meeting in Toronto, ON, 2019.

- 2019 Student Commencement Speaker, Thayer School of Engineering at Dartmouth College. *My Two Cents*. June 8th, 2019. Hanover, NH.
- International Shoulder Group Annual Meeting Travel Award – $250. Awarded for travel to Annual ISG Meeting at the Mayo Clinic in Rochester, MN, 2018.
- Dartmouth College Guarini School of Graduate and Advanced Studies Travel Award – $1000. Awarded for travel to American Society of Biomechanics (ASB) Conference and International Shoulder Group (ISG) Section, 2018.
- Force & Motion/Orthopaedic Research Society Young Scientist Award – $500. **Chapman**, **RM**, Ross-Trevor, LK, Moschetti, WE, & Van Citters, DW. *Continuously Monitoring Knee Recovery after Total Knee Arthroplasty: Gait Knee Flexion is a better Metric than Maximum Knee Flexion*. Paper No. 0190. New Orleans, LA: Orthopaedic Research Society Annual Meeting, 2018.
- Best Poster – $200. **Chapman**, **RM**, Kokko, MA, & Van Citters, DW. *Validation of Total Knee Arthroplasty (TKA) Tibial Component Placement via Gyroscopes*. Poster No. 7. Hanover, NH: Dartmouth College Graduate Student Poster Session, April 12th, 2016.
- The Dartmouth Society of Engineers Prize 2015: Meegan Daigler ’14, Th’15, William Jewett ’14, Th’15, James Kappel ’14, Th’15, Karina Packer Th’15, and Alex Rowe ’14, Th’15. Novel Prone Bicycle. Academic and Scientific Advisor: **Ryan Chapman**.
- University of St. Thomas Cum Laude, 2010.
- University of St. Thomas Chemistry Catalyst Award Winner. Given to top 5 general chemistry students each year at the University of St. Thomas.

GRANTS

- National Institutes of Health (NIH), R21: *Evaluating the Differences across Race/Ethnicity in Hip Joint Kinematics and Kinetics of Patients before and after Total Hip Arthroplasty (THA)*. $250,000. 2020. *In Review*. Role: PI.
- National Institutes of Health (NIH), Small Business Technology Transfer (STTR) Phase II: *Development and wear testing of bi-material ceramic bearing surfaces for hip arthroplasty*. $1,500,000. 2020. *In Review*. Role: PI.
- Neukom Institute CompX Faculty Award: *Computational Biomechanics Approach to Predicting Expectant Mothers with High Risk for Prolonged Labor and Unnecessary Maternal Death Risk*. $40,000. 2020. *In Edit*. Role: PI.
- Bill and Melinda Gates Foundation Global Grand Challenges Top Priorities for Maternal, Neonatal, and Child Health in Africa: *Predicting Who is at Risk for Prolonged Labor and Unnecessary Maternal Death using Biomechanics Motion Capture and Advanced Machine Learning Algorithms*. $100,000. 2020. *In Edit*. Role: Co-PI.
- National Institutes of Health (NIH), National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) R01: *Remotely Monitoring Recovery after TKA to Guide Rehabilitation*. $1,250,000. 2019. *In Edit*. Role: Co-PI.
- Neukom Scholars Fund, Dartmouth College: *Estimating Hip Joint Contact Angles (HCAs) Using Optical/Inertial Motion Capture, Wearable Plantar Force Pads, and an OpenSim Computational Biomechanics Model*. $3,500. 2019. Role: PI, Advisor.
- OrthoSensor, Inc. AWD00011128 Van Citters (PI). *Multimodal Detection Algorithms for In-Vivo Diagnostics*. $200,000. 2018-2019. Role: Postdoctoral Research Associate.
- SYNERGY Pilot Award, UL1 Grant from National Center for Advancing Translational Sciences (NCATS). *Accelerometer Capture of Knee Motion for Physical Therapy Prescription*. $50,000. 2015-2016. Role: Doctoral Research Assistant.
- OrthoSensor, Inc. AWD00010282 Van Citters (PI). *Alignment of Tibial Inserts through Implantable Electronics*. 2014-2015. Role: Doctoral Research Assistant.

PUBLICATIONS

- McCabe, MV, Van Citters, DW, & **Chapman**, **RM**. *Developing a Method for Quantifying Hip Joint Angles and Moments during Walking and Stair Ascent Using Neural Networks and Wearables*. In Review.
- **Chapman**, **RM**, McCabe, MV, & Van Citters, DW. *Activities of Daily Living Outside the Clinic: Method Development and An Initial Pilot Study Categorizing Activities using Remotely Captured Wearable Data and Machine Learning*. In Review.
- **Chapman**, **RM**, McCabe, MV, & Van Citters, DW. *Wearables and Knee Range of Motion: Optimizing Machine Learning Variables for Computing Knee Flexion with a Single Processor*. In Edit.
- **Chapman**, **RM**, Werth, PM, Moschetti, WE, & Van Citters, DW. *Altering Clinical Care using Statistics as the Foundation: An Innovative Perspective on Postoperative Orthopaedic Clinical Management*. In Review.
- **Chapman**, **RM**, Moschetti, WE, & Van Citters, DW. *Kinematic and Activity Level Measures are Different during Rehabilitation Sessions & At-Home: An Inertial Measurement Unit Pilot Study*. In Review.
- **Chapman, RM,** Torchia, MT, Bell, JE, & Van Citters, DW. *Shoulder Elevation does not improve following Reverse Shoulder Arthroplasty: A Continuous Inertial Measurement Unit Study*. In Review.
- Kokko, MA, **Chapman**, **RM**, Roche, MW, & Van Citters, DW. *Intraoperative Gyroscope-Based Measurement of Tibia Coronal Alignment in Total Knee Arthroplasty*. In Review.
- Kolz, JM, Wyles, CC, Van Citters, DW, **Chapman**, **RM**, Trousdale, RT, & Berry, DJ. *In Vivo Corrosion of Modular Dual Mobility Implants: A Retrieval Study*. Journal of Arthroplasty. 2020; (2020): 1-4. doi: 10.1016/j.arth.2020.05.075.
- Nezwek, TA, **Chapman**, **RM**, Rothy, AC, Van Citters, DW, & Koenig, K. *Bilateral Femoral Component Fractures After Primary Total Knee Arthroplasty with Cruciate-Retaining Femoral Component*. Arthroplasty Today. 2020; 6(3): 496-501. doi: 10.1016/j.artd.2020.06.001.
- **Chapman**, **RM**, Torchia, MT, Bell, JE, & Van Citters, DW. *Continuously Monitoring Shoulder Motion after Total Shoulder Arthroplasty: Maximum Elevation & Time Spent above 90° Elevation are Critical Metrics to Monitor*. Journal of Shoulder & Elbow Surgery. 2019; 28 (8): 1505-1514. doi: 10.1016/j.jse.2019.01.003.
- **Chapman**, **RM**, Moschetti, WE, & Van Citters, DW. *Stance and Swing Phase Knee Flexion Recover at Different Rates following Total Knee Arthroplasty: An Inertial Measurement Unit Study.* Journal of Biomechanics. 2019; 84 (14): 127 - 139. doi: 10.1016/j.jbiomech.2018.12.027.
- **Chapman, RM**, Torchia, MT, Bell, JE, & Van Citters, DW. *Assessing Shoulder Biomechanics of Healthy Elderly Individuals During Activities of Daily Living Using Inertial Measurement Units: High Maximum Elevation Is Achievable but Rarely Used*. ASME Journal of Biomechanical Engineering. 2019; 141 (4): 041001 – 041001 - 7. doi: 10.1115/1.4042433.
- **Chapman, RM**, Van Citters, DW, Chapman D, & Dalury, DF. *Higher offset cross-linked polyethylene acetabular liners: is wear a significant clinical concern?*. HIP International. 29 (6): 652 – 659. doi: doi.org/10.1177/1120700018815339.
- Gribbin, TC, Slater, LV, Herb, CC, Hart, JM, **Chapman**, **RM**, Hertel, J, & Kuenze, CM. *Differences in hip-knee joint coupling during gait after anterior cruciate ligament reconstruction*. Clinical Biomechanics. 32 (2016): 64 - 71. doi: 10.1016/j.clinbiomech.2016.01.006.
- Chapman, DD, et al. *The influence of age, position, and timing of surgical repair on the leg movements and kicks of infants with Spina Bifida.* Paper presented at the 2015 Annual Combined Sections Meeting of the American Physical Therapy Association, Acknowledgements section for engineering design contributions.

PODIUM PRESENTATIONS

- McCabe, MV, Van Citters, DW, **Chapman**, **RM**. *Method Development for Calculating Hip Joint Angles and Moments During Walking and Stair Ascent Using Neural Networks and Wearables*. Orthopaedic Research Society Annual Meeting, 2020. *In Review*.
- **Chapman**, **RM**, Moschetti, WE, Werth, PM, & Van Citters, DW. *Improving Postoperative Clinical Decision Making: Altering Rehabilitation After Total Knee Arthroplasty Using Statistics As The Framework*. Paper No. 35. Phoenix, AZ: Orthopaedic Research Society Annual Meeting, 2020.
- **Chapman**, **RM**, Moschetti, WE, & Van Citters, DW. *Reliance on Clinical Maximum Flexion after Total Knee Arthroplasty is Misguided: A Better Way Forward with Wearable Inertial Measurement Units*. Toronto, ON: International Society for Technology in Arthroplasty Annual Meeting, 2019.
- **Chapman**, **RM**, Moschetti, WE, & Van Citters, DW. *Altering Physical Therapy after Total Knee Arthroplasty using Statistics as the Foundation: An Innovative Framework for Improved Clinical Decisions Making*. Toronto, ON: International Society for Technology in Arthroplasty Annual Meeting, 2019.
- **Chapman**, **RM**, Torchia, MT, Bell, JE, & Van Citters, DW. *The Evolution of Postoperative Monitoring: Continuously Capturing Shoulder Elevation with Inertial Measurement Units*. Paper No. 032. Rochester, MN: International Shoulder Group Annual Meeting, 2018.
- **Chapman**, **RM**, Ross-Trevor, L, Moschetti, WE, & Van Citters, DW. *Continuously Monitoring Knee Recovery after Total Knee Arthroplasty: Gait Knee Flexion is a better Metric than Maximum Knee Flexion*. Paper No. 0190. New Orleans, LA: Orthopaedic Research Society, 2018.
- **Chapman**, **RM**, Torchia, MT, Bell, JE, & Van Citters, DW. *Total Shoulder Arthroplasty Rehabilitation: Maximum Elevation and Time Spent above 90° of Elevation are Critical Metrics to Monitor*. Paper No. 0043. New Orleans, LA: Orthopaedic Research Society, 2018.
- **Chapman**, **RM**, Bell, JE, & Van Citters, DW. *Does our Concept of Normal Shoulder Biomechanics Apply to Healthy Seniors During Activities of Daily Living?*. Paper No. 0276. San Diego, CA: Orthopaedic Research Society, 2017.
- **Chapman**, **RM**, Van Citters, DW, & Dalury, DF. *A Comparison of In-Vivo Wear: 0mm and 4mm Offset Total Hip Arthroplasty (THA) Acetabular Liners*. Podium Presentation. Boston, MA: International Society for Technology in Arthroplasty, 2016.
- **Chapman**, **RM**, Kokko, MA, Goodchild, G, Roche, M, & Van Citters, DW. *A Novel Method for Validating Total Knee Arthroplasty (TKA) Tibial Component Orientation via Gyroscopes*. E-Poster with Short Talk. Boston, MA: International Society for Technology in Arthroplasty, 2016.

POSTERS

- McCabe, MV, Van Citters, DW, & **Chapman**, **RM**. *Machine Learning and Knee Range of Motion: Optimizing Variables for Computing Knee Flexion Using Wearables and a Single Processor*. Poster No. 2244. Phoenix, AZ: Orthopaedic Research Society Annual Meeting, 2020.
- McCabe, MV, Van Citters, DW, & **Chapman**, **RM**. *Are Patients Compliant Outside of the Clinic? Categorizing Activities using Remotely Captured Wearable Data and Machine Learning*. Poster No. 1360. Phoenix, AZ: Orthopaedic Research Society Annual Meeting, 2020.
- McCabe, MV, **Chapman, RM,** & Van Citters, DW. *Remotely Monitoring Patient Activities via Inertial Measurement Units and Machine Learning: An Innovative Approach to Functional Assessment.* Hanover, NH: Dartmouth College Karen E. Wetterhahn Science Symposium, 2019.
- **Chapman**, **RM**, Moschetti, WE, & Van Citters, DW. *Are Measures Captured during Physical Therapy after Total Knee Arthroplasty Representative? An Inertial Measurement Unit Study*. Poster No. 0889. Austin, TX: Orthopaedic Research Society, 2019.
- **Chapman**, **RM**, Moschetti, WE, & Van Citters, DW. *Moving out of the Laboratory and in to the Real World: Using Inertial Measurement Units to Assess Long-Term Recovery after Total Knee Arthroplasty*. Poster No. 697. Rochester, MN: American Society of Biomechanics Annual Meeting, 2018.

- **Chapman**, **RM**, Torchia, MT, Bell, JE, & Van Citters, DW. *Assessing Recovery in Total and Reverse Shoulder Arthroplasty via Inertial Measurement Units: What Metrics are Important to Measure?*. Poster No. 695. Rochester, MN: American Society of Biomechanics Annual Meeting, 2018.
- Kardassakis, TR, **Chapman**, **RM**, & Van Citters, DW. *Unloading Femur Fractures: A Validation Study Assessing the Efficacy of Novel Force Insoles.* Hanover, NH: Dartmouth College Karen E. Wetterhahn Science Symposium, 2018.
- **Chapman**, **RM**, Torchia, MT, Bell, JE, & Van Citters, DW. *Reverse Shoulder Arthroplasty Rehabilitation: Maximum Shoulder Elevation is not the Critical Metric to Monitor After Surgery*. Poster No. 1056. New Orleans, LA: Orthopaedic Research Society, 2018.
- **Chapman**, **RM**, Moschetti, WE, & Van Citters, DW. *A Novel Method for Remotely Monitoring Knee Function using Inertial Measurement Units*. Poster No. 1873. San Diego, CA: Orthopaedic Research Society, 2017.
- **Chapman**, **RM**, Kokko, MA, & Van Citters, DW. *Validation of Total Knee Arthroplasty (TKA) Tibial Component Placement via Gyroscopes*. Poster No. 7. Hanover, NH: Dartmouth College Graduate Student Poster Session, April 12th, 2016.
- **Chapman**, **RM**, Goodchild, G, Roche, M, & Van Citters, DW. *Validation of Total Knee Arthroplasty (TKA) Tibial Component Placement via Gyroscopes.* Poster No. 1975. Orlando, FL: Orthopaedic Research Society, 2016.
- **Chapman**, **RM**, Van Citters, DW, Chapman, D, & Dalury, DF. *A Comparison of In-Vivo Wear: 0mm and 4mm Offset Total Hip Arthroplasty (THA) Acetabular Liners*. Poster No. 2199. Orlando, FL: Orthopaedic Research Society, 2016.
- **Chapman**, **RM**, Mayor, MB, & Van Citters, DW. *A joint retrieval registry does not represent the United States population for primary reason for revision in total knee arthroplasty (TKA)*. Poster No. P193. Orlando, FL: American Academy of Orthopaedic Surgeons, 2016.
- Gribbin TC, Slater LV, Herb CC, Kuenze CM **Chapman RM**, Hertel J, & Hart JM. *Differences in hip-knee joint coupling during gait after ACL reconstruction*. Poster No. 2181. Medicine & Science in Sports & Exercise. 47 (5S): 576.
- Lazaro RM, **Chapman**, **RM**, Peck, T, Prokopy, M, Magrum, E, & Wilder, RP. *Correlating knee frontal angle of the drop-jump and single-leg step-down tests with three-dimensional kinematics of midstance running gait.* Poster No. 292. Boston, MA: American Academy of Physical Medicine and Rehabilitation Annual Assembly, 2015.
- **Chapman**, **RM**, Yen, CL, & Morton, SM. *The effect of cathodal transcranial direct current stimulation (tDCS) on reaching movements in healthy adults*. Program No. 650.16/TT12 2013 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2013.
- Yen, CL, **Chapman**, **RM**, & Morton, SM. *What repetitive transcranial magnetic stimulation parameters best induce short-term inhibition of primary motor cortex?*. Program No. 468.06/EEE20 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2013.

PATENTS

- **Chapman**, **RM**, et al. 2017. Movement Monitoring Systems and Methods. US 16/596123, filed October 8th, 2019. Patent pending
- **Chapman**, **RM**, et al. 2017. Movement Monitoring Systems and Methods. US 1054635279B2, filed August 24th, 2017. Issued November 5th, 2019.
- **Chapman**, **RM**, et al. 2015. Orthopedic Leg Alignment System and Method. US 2015449791, filed March 3rd, 2017. Patent pending.
- Chapman, DD and **Chapman**, **RM**. 2013. Stationary Infant Chair for Improving the Lower Extremity Function in Infants with Neuromuscular Impairments. US Provisional 61761158, filed February 5th, 2013. Patent pending.

INVITED LECTURES

- **Chapman**, **RM**. *Adding to the Physical Therapists Toolbox: How Can Motion Capture (MOCAP) Improve Your Clinical Practice?*. St. Catherine University Doctor of Physical Therapy Program (DPT 6060 – Pediatrics) Guest Lecture, St. Catherine University, Minneapolis, MN, July 15th, 2020.
- **Chapman, RM**. *Human Biomechanics, Disruptive Medical Devices, & The Pursuit of Improved Healthcare Value*. West Chester University Biomedical Engineering Department Tenure Track Faculty Search Research Lecture, West Chester University, West Chester, PA, January 27th, 2020.
- **Chapman, RM**. *Vectors: Are they really villains?*. West Chester University Biomedical Engineering Department Tenure Track Faculty Search Teaching Lecture, West Chester University, West Chester, PA, January 27th, 2020.
- **Chapman, RM**. *Biomaterials, Engineering Decisions, and the Impact on Patients*. St. Olaf College Department of Physics (PHYS 362: Materials Engineering and Nanoscience) Guest Lecture, St. Olaf College, Northfield, MN, November 7th, 2019.
- **Chapman, RM**. *One Dartmouth: A Moderated Discussion with Current and Former Graduate Students Regarding Updates from the Graduate Schools and Changes at Dartmouth*. Dartmouth Fall Reunion 2019 for the Alumni and Guests of the Classes of 1944, 1949, and 1954. Dartmouth College, Hanover, NH, September 27th, 2019.
- **Chapman**, **RM**. *Improving Healthcare Value via Biomechanics*. University of District of Columbia Visiting Faculty Search Interview Spotlight Lecture, University of District of Columbia, Washington, DC, August 21st, 2019.
- **Chapman, RM**. *Motion Capture Techniques: Use for Physical Therapists and Rehabilitation*. St. Catherine University Doctor of Physical Therapy Program (DPT 6060 – Pediatrics) Guest Lecture, St. Catherine University, Minneapolis, MN, June 19th, 2019.
- **Chapman, RM**. *My Two Cents – A Commencement Address*. Thayer School of Engineering Investiture at Dartmouth College, Hanover, NH, June 8th, 2019.
- **Chapman, RM,** Martin, AJ, & Van Citters DW. *Orthopaedic Biomechanics – A Hierarchical Approach: From cells to the system and its implications on biomaterials*. Thayer School of Engineering (ENGS 165 – Biomaterials) Guest Lecture, Dartmouth College, Hanover, NH, May 14th, 2019.
- **Chapman, RM** and Martin, AJ. *Orthopaedic Biomechanics – A Hierarchical Approach: From cells to the system*. Thayer School of Engineering (ENGS 199 – Biomechanics: From Cells to Organisms) Guest Lecture, Dartmouth College, Hanover, NH, May 22nd, 2018.
- **Chapman, RM**, Bell, JE, Moschetti, WE, & Van Citters DW. *A Novel Patient Monitoring System: Application of Inertial Measurement Units (IMU) to Knee and Shoulder Biomechanics*. Department of Physical Therapy Seminar, Dartmouth Hitchcock Medical Center, Lebanon, NH, November 22nd, 2016.
- **Chapman, RM** & Van Citters, DW. *New Approaches to Biomechanics: Wearable Sensors in the Clinic and OR*. Department of Orthopaedics Grand Rounds, Dartmouth Hitchcock Medical Center, Lebanon, NH, May 13th, 2016.

MENTEES & MENTEE PROJECTS

- Julia Bellamy, John Berry III, Mara McCollor, Michael Moyo, & Emmanuel Sanon; Introduction to Engineering Design Project – Correcting and Preventing At-Home Exercise Induced Injury Risks.
- Matthew Blouch, Julia Robitaille, & Jesse VanNewkirk; Introduction to Engineering Design Project – BackStrap: An innovative standing desk attachment, wearable device for improving the posture of desk workers.
- Fedor Myagkov & Tanguy Nef; Senior Honors Theses – Developing easy to use clinical tools for evaluating skiers' knee stability post-ACL reconstruction with wearable sensors and machine learning techniques.

- Aditi Gupta; WISP – Quantifying weight bearing compliance in patients following traumatic distal femoral fracture using innovative, instrumented, wearable shoe insoles.
- Lauren Goyette; WISP – Implementing an updated and improved quantitative scoring scale for failed, retrieved, orthopaedic implants.
- Sophie Edelman, Ethan Adner, Matthew Osborne, & Yorkiris Marmol Contreras; Introduction to Engineering Design Project – Crutched It! A body-mounted gyroscopically stabilized cafeteria tray holding mechanism for individuals using crutches.
- Rose Gold, Eric Stolt, & Archer Chapin; Senior Design Project – Development of an electromagnetic tracking device for assessing fetal descent through the birth canal during labor and delivery.
- Allison Anderson; Independent Study – Creation of an easier to don custom pair of footwear in collaboration with Nike for a high-school aged student athlete with cerebral palsy.
- Allison Anderson, Peter Vo, Loghan Thomas, & Tara Greaney; Senior Design Project – Developing, implementing, and commercializing a soft ankle orthosis brace and installation for the same for the treatment of the condition of foot drop.
- Thomas Fortney; Medical Resident Project – Identification of wear and material loss using a coordinate measurement machine in metal on metal total hip arthroplasty components.
- Megan McCabe; WISP through Senior Honors Thesis – Activity classification from inertial measurement unit data using simultaneous machine learning and first principles approaches.
- Maria Garman; Independent Study – What footwear specific factors influence lower extremity force application and the risk for tibial stress fractures? Assessment of a novel maximally cushioned training shoe for track and field athletes via instrumented insoles.
- Josephine Kalshoven; WISP through Senior Honors Thesis – Developing a non-destructive method for measuring polyethylene wear in retrieved total knee arthroplasty tibial components.
- Meredith Anderson; Sophomore Scholar – Development of a novel inertial measurement unit based method for evaluating cervical spine motion during patient evacuation following remote trauma.
- Tessa Kardassakis; WISP – Validation of novel instrumented insoles for assessing partial weight bearing in individuals with traumatic femoral fracture repair.
- Lindsay Ross-Trevor; Research Assistant – Validation of novel inertial measurement unit sagittal knee kinematics in patients undergoing total knee arthroplasty.
- Abigail Baldwin; WISP through Senior Honors Thesis – Development and validation of a measurement and analysis program for the polyethylene components of total shoulder retrievals
- Alex Brown, Alex Rowe, Meegan Daigler, Hunter Kappel, Karina Packer, & William Jewett; Senior Design Project – Development and testing of a novel prone bicycle.

OTHER SERVICE ACTIVITIES

- Committee member on the working group for Increasing Financial Aid for the 5th Year of the Bachelors of Engineering program
- Seminar lead for *Thayer Community Builders* responsible for conducting remote sessions on mask construction during the COVID-19 pandemic
- Director of Quality Control for Thayer School of Engineering High Performance Mask Sewing Squad – Responsible for ensuring the correct and complete construction of medical grade masks during the COVID-19 pandemic.
- Member of several academic bodies including American Society of Biomechanics and the Orthopaedic Research Society
- Journal reviewer for numerous international peer reviewed journals including 'The Knee,' 'Applied Biomechanics,' 'Journal of Biomechanics,' 'ASME Journal of Biomechanical Engineering,' 'HIP International,' 'The Journal of Shoulder and Elbow Surgery,' and 'The Journal of Clinical Medicine.'

- Grant reviewer for the New England Pediatric Device Consortium (NEPDC) and the Center for Translation of Rehabilitation Engineering Advances and Technology (TREAT)
- Moderator during podium sessions at annual meeting of the International Society for Technology in Arthroplasty
- Thayer School of Engineering Tour Guide

PERSONAL INTERESTS

Volunteer Work

- Project Healing Waters
  - Project Lead – Greater Connecticut Upper Valley Chapter
  - Non-profit organization providing recreational therapy opportunities to veterans through fly fishing
- Special Olympics
  - New Hampshire Chapter Volunteer
  - Non-profit organization that hosts sporting and competition events (e.g. alpine and Nordic skiing).

Hobbies

- Outdoors activities: Fly fishing, upland bird hunting, hiking
- Physical fitness: Running with my dog, weight-lifting
- Wood working

REFERENCES

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