

# Curriculum Vitae

**Dr. Reuben H. Kraft**

Computational Biomechanics Laboratory  
Departments of Mechanical and Biomedical Engineering  
320 Leonhard Building  
Pennsylvania State University  
University Park, PA 16802  
reuben.kraft@psu.edu  
<https://psucompbio.org>

## Education and Training

2009	Post-Doctoral	U.S. Army Research Laboratory, Aberdeen Proving Ground, Maryland
2008	Ph. D.	Mechanical Engineering, Johns Hopkins University
2006	M.S.	Mechanical Engineering, Johns Hopkins University
2003	B.S.	Mechanical Engineering, University of Maryland, Baltimore County

## Professional Experience

July 2016 – present	Assistant Professor of Biomedical Engineering (courtesy), Pennsylvania State University
Aug 2013 – present	Assistant Professor of Mechanical Engineering, Pennsylvania State University
June 2012–June 2013	Lead Researcher of Computational Biomechanics, Johns Hopkins University Applied Physics Laboratory, Research and Exploratory Development Department, Biomechanics and Injury Mitigation Systems Group
Feb 2009 –June 2012	Mechanical Engineer, U.S. Army Research Laboratory, Soldier Protection Sciences Branch
May 2008 – Feb 2009	Post-Doc, Oak Ridge Associated Universities, U.S. Army Research Laboratory, Impact Physics Branch

## Honors and Awards

2016	First Place Paper and Oral Student Presentation, 13th Annual Penn State College of Engineering Research Symposium (CERS), Shruti Motiwale.
2016	People's Choice Poster Student Award, 2016 (Ernst) Mach Conference, Allison Ranslow.
2013 – 2016	Shuman Early Career Professorship, Pennsylvania State University, Department of Mechanical and Nuclear Engineering.
2011	Presidential Early Career Awards for Scientists and Engineers (PECASE), The White House; Office of Science and Technology Policy.

## Memberships in Professional Organizations

- Member, American Society of Mechanical Engineers (Jan 2003 – present)
- Member, United States Association for Computational Mechanics (February 2014 – present)
- Member, American Physics Society (May 2013 – present)
- Member, American Society for Engineering Education (May 2013 – present)
- Member, American Society of Biomechanics (May 2013 – present)

## Editorial Service

Nov 2014 – present      *Frontiers in Bioengineering and Biotechnology*, Associate Editor.  
<http://www.frontiersin.org/Biomechanics>.

## Journal and Conference Reviewer

- APS Physical Review Letters
- Nature Protocols
- Experimental Mechanics
- Numerical Methods in Biomedical Engineering
- Journal of Biomechanics
- Sensors
- ACS Biomaterials Science & Engineering
- Journal of the Mechanical Behavior of Biomedical Materials
- Annual Penn State College of Engineering Research Symposium
- Journal of Visual Experiments (JoVE)
- Materials and Design
- PLOS ONE
- Computer Methods in Biomechanics and Biomedical Engineering
- ASME Journal of Biomechanical Engineering
- Biomechanics and Modeling in Mechanobiology
- Journal of Mechanics in Medicine and Biology
- Journal of Neurotrauma
- Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C)
- ASME's International Mechanical Engineering Congress and Exposition (IMECE)

## Professional Service

2018	National Institutes of Health, National Institute of Dental and Craniofacial Research (NIDCR), Panel Member
2017 – present	Activity Insight Faculty Users Committee, Member Institute for Cyber Science Department, Liaison
2017 – 2018	Faculty Search Committee for Mechanical Systems in Mechanical and Nuclear Engineering, Member
2017	National Science Foundation, Computational and Data-Enabled Science and Engineering, Panel Member
2016 – 2017	Faculty Search Committee for Emerging Areas in Mechanical and Nuclear Engineering, Member

2015	Department of Defense, National Defense Science and Engineering Graduate (NDSEG), Reviewer
2015	Naval Research Laboratory (NRL) Postdoctoral Fellowship Program, Reviewer
2014 – present	PhD Candidacy Exams Proctor and Oral Examiner, Member
2014 – present	Huck Institute of the Neurosciences Conference Committee, Member
2014 – 2015	Graduate Student Recruiting Committee, Member
2014 – 2015	Faculty Search Committee for Mechanical Systems in Mechanical and Nuclear Engineering, Member
2014 – 2015	NDSEG Fellowship Evaluation Panelist, Panelist
2014	Undergraduate Exhibition, College of Engineering, Judge
2012	Congressionally Directed Medical Research Programs (CDMRP), Reviewer

### Conference Organizer

2017	"Multiscale Brain Mechanics: From Growth to Injury" symposium, 18th U.S. National Congress for Theoretical and Applied Mechanics. Co-organizer
2016	Brain Injury Symposium at Summer Biomechanics, Bioengineering, and Biotransport (SB3C) Conference, National Harbor, Maryland U.S.A. Activities Part of American Society of Mechanical Engineers (ASME) Bioengineering Division (BED). Co-Chairperson
2014 – present	Damage Biomechanics Symposium, ASME International Mechanical Engineering Congress and Exposition (IMECE). Multi-Year Co-Organizer and Co-Chairperson
2015	Advances in Computational Biomechanics Symposium, Pan-American Congress on Computational Mechanics International Conference, Buenos Aires Argentina. Co-Organizer and Co-Chairperson
2014	2014 Mid-Atlantic Section of the American Physical Society (APS). University Park, Pennsylvania. Co-Organizer and Co-Chairperson
2013 - 2014	Biomechanics of Trauma Due to Accident, Surgery or Weapons Symposium, 2014 ASME International Mechanical Engineering Congress and Exposition (IMECE). Montreal Canada. Co-Organizer and Co-Chairperson

### Peer Reviewed Journal Publications

*Kraft's students and postdocs underlined.*

1. Garimella, H. T., **Kraft, R. H.**, & Przekwas, A. J. (2018). Do blast-induced skull flexures result in axonal deformation? *PLOS One*. <http://doi.org/10.1371/journal.pone.0190881>.

2. Serruya, M. D., Harris, J. P., Adewole, D. O., Struzyna, L. A., Burrell, J. C., Nemes, A., Petrov, D., **Kraft, R. H.**, Chen, H. I., Wolf, J. A., & Cullen, D. K. (2017). Engineered axonal tracts as "living electrodes" for synaptic-based modulation of neural circuitry. *Advanced Functional Materials*, 1701183–n/a. doi: 1616-3028.
3. Lee, C. X., Richtsmeier, J. T., & **Kraft, R. H.** (2017). A computational analysis of bone formation in the cranial vault using a coupled reaction-diffusion-strain model. *Journal of Mechanics in Medicine and Biology*. doi: 10.1142/S0219519417500737.
4. Garimella, H. T., & **Kraft, R. H.** (2017). A new computational approach for modeling diffusion tractography in the brain. *Journal of Neural Regeneration Research*, 12(1). doi: 10.4103/1673-5374.198967.
5. Garimella, H. T., & **Kraft, R. H.** (2016). Modeling the mechanics of axonal fiber tracts using the embedded finite element method. *International Journal for Numerical Methods in Biomedical Engineering*(e02823), 1–21. doi: 10.1002/cnm.2796.
6. Fielding, R. A., Przekwas, A. J., Tan, X. G., & **Kraft, R. H.** (2015). Development of a lower extremity model for high strain rate impact loading. *International Journal of Experimental and Computational Biomechanics*, 3(2), 161-186.
7. Lee, C. X., Richtsmeier, J. T., & **Kraft, R. H.** (2015). A Computational Analysis of Bone Formation in the Cranial Vault in the Mouse. *Frontiers in Bioengineering and Biotechnology*, 3(24). <http://journal.frontiersin.org/article/10.3389/fbioe.2015.00024>.
8. Swab, J. J., Tice, J., Wereszczak, A. A., & **Kraft, R. H.** (2014). Fracture toughness of advanced structural ceramics: Applying ASTM C1421. *Journal of the American Ceramic Society*, pp. 1-9. <https://doi.org/10.1111/jace.13293>.
9. Clayton, J. D., **Kraft, R. H.**, & Leavy, R. B. (2012). Mesoscale modeling of nonlinear elasticity and fracture in ceramic polycrystals under dynamic shear and compression. *Journal of Solids and Structures*, 49(18), 6. <http://doi:10.1016/j.jisolsolstr.2012.05.035>.
10. **Kraft, R. H.**, Mckee, P. J., Dagro, A. M., & Grafton, S. T. (2012). Combining the finite element method with structural connectome-based analysis for modeling neurotrauma: Connectome neurotrauma mechanics. *PLoS Computational Biology*, 8(8), e1002619. <http://dx.doi.org/10.1371/journal.pcbi.1002619>.
11. **Kraft, R. H.**, & Molinari, J. F. (2008). A statistical investigation of the effects of grain boundary properties on transgranular fracture. *Acta Materialia*, 56(17), 10. <http://doi:10.1016/j.actamat.2008.05.036>.
12. **Kraft, R. H.**, Molinari, J. F., Ramesh, K. T., & Warner, D. W. (2008). Computational micromechanics of dynamic compressive loading of a brittle polycrystalline material using a distribution of grain boundary properties. *The Journal of Mechanics and Physics of Solids*, 56, 23. <http://doi:10.1016/j.jmps.2008.03.009>.

## Manuscripts Accepted for Publication

*Kraft's students and postdocs underlined.*

1. Ranslow, A., Fang, Z., & **Kraft, R. H.** The multiaxial failure response of porcine trabecular skull bone estimated using microstructural simulations. *ASME Journal of Biomechanical Engineering*. [Accepted February 2018].
2. Subramani, A. V., Motiwale, S., Zhou, A., & **Kraft, R. H.** A non-linear multi-axial fatigue damage model for the cervical intervertebral disc annulus. *Advances in Mechanical Engineering*.

## Manuscripts Submitted for Publication

*Kraft's students and postdocs underlined.*

1. Dhobale, A. V., Adewole, O., Chan, A., Marinov, T., Serruya, M., **Kraft, R. H.**, & Cullen, D. Kacy Assessing functional connectivity of micro-tissue engineered neural networks using calcium fluorescence imaging. *Journal of Neural Engineering*. [Submitted November 2017].

## Manuscripts to be Submitted for Publication

*Kraft's students and postdocs underlined.*

1. Gerber, J.I., Garimella, H.T., & **Kraft, R. H.** Computation of history-dependent mechanical damage of axonal fiber tracts in the brain. *Biomechanics and Modeling in Mechanobiology*. Anticipated submission: May 2018.

## Book Chapters

1. **Kraft, R. H.** (Primary Author), Fielding, R. A., Lister, K., Shirley, A., Marler, T., Merkle, A. C., Przekwas, A. J., Tan, X. G., & Zhou, X. (2016). Modeling skeletal injuries in military scenarios. *Mechanobiology and mechanophysiology of military-related injuries*. Springer Berlin Heidelberg. doi: 10.1007/8415\_2016\_191.
2. Clayton, J. D., & **Kraft, R. H.** (2011). Mesoscale modeling of dynamic failure of ceramic polycrystals. In J. J. Swab (Ed.), *Advances in Ceramic Armor VII: Ceramic Engineering and Science Proceedings*. (568) . John Wiley & Sons. Peer-reviewed/refereed. doi: 1118173090, 9781118173091.

## Conference Proceedings, Refereed

*Kraft's students and postdocs underlined.*

1. Chan, A. H. W., Dhobale, A., Adewole, O., Marinov, T., **Kraft, R. H.** (Author), Cullen, D. K., & Serruya, M. (2016). Analysis of spontaneous calcium signals to infer functional connectivity within a novel "living electrode" neural construct. (pp. 1–2). IEEE. doi: 1-5090-6713-2
2. Motiwale, S., Subramani, V. V., Zhou, X., & **Kraft, R. H.** Damage prediction for a cervical spine intervertebral disc. Volume 3: Biomedical and Biotechnology Engineering(IMECE2016-67711). Proceedings of the 2016 American Society of Mechanical Engineers Congress and Explosion. doi: 10.1115/IMECE2016-67711.
3. Lee, C., & **Kraft, R. H.** (2016). A coupled reaction-diffusion-strain model for bone growth in the cranial vault. Proceedings of the 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C2016). <http://archive.sb3c.org>.
4. Ranslow, A. N., & **Kraft, R. H.** (2016). The development of a "fuzzy" yield envelope for trabecular porcine skull bone using numerical simulations. Proceedings of the 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C2016). <http://archive.sb3c.org>.
5. Motiwale, S., Eppler, W., Hollingsworth, D., Hollingsworth, C., Morgenthau, J., & **Kraft, R. H.** (2016). Application of neural networks for filtering non-impact transients recorded from biomechanical sensors. *Proceedings of the IEEE International Conference on Biomedical and Health Informatics*. (pp. 204 - 207). IEEE. doi: 10.1109/BHI.2016.7455870.

6. Reddy, S. N., Fielding, R. A., Robinson, M. J., & Kraft, R. H. (2015). A computational study of fracture in the calcaneus under variable impact conditions. Volume 3: Biomedical and Biotechnology Engineering, (pp. pp. V003T03A058; 10 pages). American Society of Mechanical Engineers Congress and Explosion. doi:10.1115/IMECE2015-51984.
7. Ranslow, A. N., Kraft, R. H., Shannon, R., De Tomas-Medina, P., Radovitsky, R., Jean, A., Hautefeuille, M. P., Fagan, B., Ziegler, K. A., Weerasooriya, T., Dileonardi, A. M., Gunnarsson, A., & Satapathy, S. Microstructural analysis of porcine skull bone subjected to impact loading. Volume 3: Biomedical and Biotechnology Engineering, (pp. pp. V003T03A057; 10 pages). American Society of Mechanical Engineers Congress and Explosion. doi:10.1115/IMECE2015-51979.
8. Garimella, H. T., Yaun, H., Johnson, B. D., Slobounov, S., & Kraft, R. H. (2015). Anisotropic constitutive model of human brain with intravoxel heterogeneity of fiber orientation using diffusion spectrum imaging (DSI). Volume 3: Biomedical and Biotechnology Engineering, (pp. pp. V003T03A011; 9 pages). Proceedings of the 2014 American Society of Mechanical Engineers Congress and Exposition. doi:10.1115/IMECE2014-39107.
9. Fielding, R. A., Tan, X. G., Przekwas, A. J., Kozuch, C. D., & Kraft, R. H. (2015). High rate impact to the human calcaneus: A micromechanical analysis. Volume 3: Biomedical and Biotechnology Engineering, (pp. V003T03A009, (8 pages). American Society of Mechanical Engineers Congress and Explosion. ISBN: 978-0-7918-4646-9.
10. **Kraft, R. H., & Garimella, H. T.** Embedded finite elements for modeling traumatic axonal injury. *Proceedings of the Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C 2015)*. American Society of Mechanical Engineers. <http://2015.sb3c.org/>.
11. Makwana, A. R., Krishna, A. R., Yuan, H., Kraft, R. H., Zhou, X., Przekwas, A. J., & Whitley, P. (2014). Towards a micromechanical model of intervertebral disc degeneration under cyclic loading. (IMECE2014-39174), (pp. pp. V003T03A012; 7 pages). American Society of Mechanical Engineers Congress and Explosion. doi: 10.1115/IMECE2014-39174.
12. Lee, C., Richtsmeier, J. T., & Kraft, R. H. (2014). A multiscale computational model for the growth of the cranial vault in craniosynostosis. (IMECE2014-38728), (pp. pp. V009T12A061; 6 pages). American Society of Mechanical Engineers Congress and Explosion. doi: 10.1115/IMECE2014-38728.
13. Fielding, R. A., Kraft, R. H., Ryan, T. M., & Stecko, T. D. (2014). A micromechanics-based simulation of calcaneus fracture and fragmentation due to impact loading. 11th World Congress on Computational Mechanics (WCCM XI) 5th. European Conference on Computational Mechanics (ECCM V) 6th. European Conference on Computational Fluid Dynamics (ECFD VI). <http://www.wccm-eccm-ecfd2014.org/admin/files/filePaper/p3774.pdf>.
14. Zhang, J., Merkle, A. C., Carneal, C. M., Armiger, R. S., **Kraft, R. H.**, Ward, E. E., Ott, K. A., Wickwire, A. C., Dooley, C. J., Harrigan, T. P., & Roberts, J. C. (2013). Effects of torso-borne mass and loading severity on early response of the lumbar spine under high-rate vertical loading. International Research Council on Biomechanics of Injury. [http://www.ircobi.org/downloads/irc13/pdf\\_files/19.pdf](http://www.ircobi.org/downloads/irc13/pdf_files/19.pdf).
15. **Kraft, R. H.,** Dagro, A. M., McKee, P. J., Grafton, S. T., Vettel, J., McDowell, K., Vindiola, M., & Merkle, A. C. (2013). Combining the finite element method with structural network-based analysis for modeling neurotrauma. (pp. 4). 11th International Symposium, Computer Methods in Biomechanics and Biomedical Engineering. <http://cmbbe13.sci.utah.edu/proceedings.html>.

16. Scheidler, M., Fitzpatrick, J., & **Kraft, R. H.** (2011). In Tom Proulx (Ed.), Optimal pulse shapes for SHPB tests on soft materials. 1, (pp. 259-268). Society for Experimental Mechanics Series, Dynamic Behavior of Materials. doi: 2191-5644.
17. **Kraft, R. H.**, Lynch, M. L., & Vogel, E. W. (2011). Computational failure modeling of lower extremities. RTO-MP-HFM-207AC/323(HFM-207)(TP/412) . NATO Human Factors and Medicine Panel. ISBN: 978-92-837-0153-8.
18. Clayton, J. D., & **Kraft, R. H.** (2011). Mesoscale modeling of dynamic failure of ceramic polycrystals. Proceedings of the 35th International Conference on Advanced Ceramics and Composites.
19. Vettel, J. M., Bassett, D. S., **Kraft, R. H.**, & Grafton, S. T. (2010). Physics-based models of brain structure connectivity informed by diffusion weighted imaging. 27th Army Science Conference.
20. Gazonas, G. A., McCauley, J. W., **Kraft, R. H.**, Love, B. M., Clayton, J. D., Casem, D., Dandekar, D., Rice, B., Batyrev, I., Weingarten, N. S., & Schuster, B. E. (2010). Multiscale modeling of armor ceramics: Focus on AION. 27th Army Science Conference.
21. Scheidler, M., & **Kraft, R. H.** (2010). In C. P. Hoppel (Ed.), Inertial effects in compression Hopkinson bar tests on soft materials. U.S. Army Research Laboratory, 1st Annual ARL Ballistic Technology Workshop.
22. **Kraft, R. H.**, Batyrev, I., Lee, S., Rollett, A. D., & Rice, B. (2010). In J. J. Swab, S. Mathur and T. Ohji (Eds.), "Multiscale modeling of armor ceramics." *Journal of the American Ceramics Society Meeting Proceedings.*, 31 . Hoboken, NJ: John Wiley & Sons, Inc. doi: 10.1002/9780470944004
23. Wereszczak, A. A., & **Kraft, R. H.** (2003). In W. M. Kriven and H. T. Lin (Eds.), Flexural and torsional resonances of ceramic tiles via impulse excitation of vibration. 24(4), (pp. 207-213). 27th Annual Conference on Advanced Ceramics and Composites: B: Ceramic Engineering and Science Proceedings. doi: 10.1002/9780470294826.ch31.
24. Wereszczak, A. A., & **Kraft, R. H.** (2002). In H. T. Lin and M. Singh (Eds.), Instrumented Hertzian indentation of armor ceramics. 23(3), (pp. 11). 26th Annual Conference on Composites, Advanced Ceramics, Materials, and Structures: A: Ceramic Engineering and Science Proceedings. doi: 10.1002/9780470294741.ch7.

## Technical Reports, Refereed

1. Dagro, A. M., McKee, P. J., **Kraft, R. H.**, Zhang, T. G., & Satapathy, S. S. (2013). A preliminary investigation of traumatically induced axonal injury in a three-dimensional (3-D) finite element model (FEM) of the human head during blast-loading. *Army Research Laboratory Technical Report (ARL-TR-6504)*. <http://www.ntis.gov/search/product.aspx?ABBR=ADA588181>.
2. Vettel, J., Dagro, A. M., Gordon, S., Kerick, S., **Kraft, R. H.**, Luo, S., Rawal, S., Vindiola, M., & McDowell, K. (2012). Brain structure-function couplings (FY11). *Army Research Laboratory Technical Report (ARL-TR-5893)*. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA556969&#8206>.
3. **Kraft, R. H.**, & Wozniak, S. L. (2011). A review of computational spinal injury biomechanics research and recommendations for future efforts. *Army Research Laboratory Technical Report (ARL-TR-5673)*. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA549868>.

4. **Kraft, R. H.**, & Dagro, A. M. (2011). Design and implementation of a numerical technique to inform anisotropic hyperelastic finite element models using diffusion-weighted imaging. *Army Research Laboratory Technical Report (ARL-TR-5796)*. <http://www.dtic.mil/dtic/tr/fulltext/u2/a565877.pdf>.
5. Gozonas, G. A., McCauley, J. W., Batyrev, I. G., Casem, D., Clayton, J. D., Dandekar, D. P., **Kraft, R. H.**, Love, B. M., Rice, B. M., Schuster, B. E., & Weingarten, N. S. (2011). Multiscale modeling of armor ceramics: Focus on ALON. *Army Research Laboratory Reprint (ARL-RP-337)*. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA553163>.
6. Vettel, J. M., Bassett, D., **Kraft, R. H.**, & Grafton, S. (2010). Physics-based models of brain structure connectivity informed by diffusion-weighted imaging. *Army Research Laboratory Technical Reprint (ARL-RP-0355)*. Aberdeen Proving Ground, MD: U.S. Army Research Laboratory. <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA552479>.
7. Wereszczak, A. A., Swab, J. J., & **Kraft, R. H.** (2005). Effects of machining on the uniaxial and equibiaxial flexure strength of CAP3 AD-995 Al<sub>2</sub>O<sub>3</sub>. *Army Research Laboratory Technical Report (ARL-TR-3617)*. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA441313>.
8. Swab, J. J., Wereszczak, A. A., Tice, J., Caspe, R., **Kraft, R. H.**, & Adams, J. (2005). Mechanical and thermal properties of advanced ceramics for gun barrel applications. *Army Research Laboratory Technical Report (ARL-TR-3417)*. <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA430400>.

## Academic Presentations

1. De Tomas, P., **Kraft, R. H.**, & Franck, C. (July 2018). "An image guided computational model of high strain rate loading to neuronal constructs," World Congress of Biomechanics, Dublin, Ireland.
2. **Kraft, R. H.**, & Garimella, H. T. (July 2018). "Do blast-induced skull flexures result in axonal deformation?" World Congress of Biomechanics, Dublin, Ireland.
3. **Kraft, R. H.**, Garimella, H. T., & Gerber, J. (July 2018). "Tracking Damage in a Digital Brain," World Congress of Biomechanics, Dublin, Ireland.
4. Hertel, Z. R., Schumacher, S. C., & **Kraft, R. H.** (Author Only). (April 2018). "Failure Models for Soft Materials in Particle Based Methods," 2018 Mach Conference, Hopkins Extreme Materials Institute, Annapolis, MD.
5. Gerber, J. I., Garimella, T., & **Kraft, R. H.** (Author Only). (November 2017). "A Computational Approach to Model Damage in Axonal Fiber Tracts of the Brain," ASME 2017 International Mechanical Engineering Congress & Exposition, The American Society Of Mechanical Engineers, Tampa, FL, peer-reviewed/refereed. International.
6. **Kraft, R. H.** (April 2017). "A Coupled Reaction-Diffusion-Strain Model of Bone Growth in the Cranial Vault," 11th Structural Birth Defects Meeting, Society for Developmental Biology, Bethesda, MD. Invited.
7. Hertel, Z. R., Schumacher, S. C., & **Kraft, R. H.** (Author Only). (April 2017). "Development of a Failure Model for Biological Materials Within the Particle Based Software Kodiak," 2017 Mach Conference, Hopkins Extreme Materials Institute, Annapolis, MD.



8. **Kraft, R. H.** (March 2017). "Multiscale Modeling of the Axonal Tract Level in the Brain," Invited Speaker, 43rd Northeast Bioengineering Conference, New Jersey Institute of Technology (NJIT), Department of Biomedical Engineering, Newark, NJ. Invited.
9. Yuchi, L., & **Kraft, R. H.** (March 2017). "Bidirectional Growth Model of Micro-Tissue Engineered Neuronal Networks (micro-TENNs)," Keystone Connectomics Conference X2, Santa Fe, New Mexico.
10. Dhobale, A., & **Kraft, R. H.** (March 2017). "Functional Connectivity Analysis of Micro-Tissue Engineered Neural Networks," Keystone Connectomics Conference X2, Santa Fe, New Mexico.
11. **Kraft, R. H.** (March 2017). "Recent Innovations in Modeling the Brain," Soldier Protection Sciences Branch Seminar Series, Army Research Laboratory, Aberdeen Proving Ground, MD. Invited.
12. Fang, Z., Ranlow, A. N., & **Kraft, R. H.** (Author Only). (November 2016). "Computational Micromechanics of Trabecular Porcine Skull Bone using the Material Point Method," ASME 2016 International Mechanical Engineering Congress & Exposition, The American Society Of Mechanical Engineers, Phoenix, AZ, peer-reviewed/refereed. International.
13. Garimella, H. T., & **Kraft, R. H.** (Author Only). (November 2016). "Disruption in Electromechanical Behavior of Axonal Fiber Tracts during Concussion: A Multiscale Modeling Approach," ASME 2016 International Mechanical Engineering Congress & Exposition, The American Society Of Mechanical Engineers, Phoenix, AZ, peer-reviewed/refereed. International.
14. Motiwale, S., Zhou, A., Subramani, A. V., & **Kraft, R. H.** (Author Only). (November 2016). "Fatigue Failure in the Spine: A Non-linear Damage Model for the Annulus of the Intervertebral Disc Under Cyclic Loading," ASME 2016 International Mechanical Engineering Congress & Exposition, The American Society Of Mechanical Engineers, Phoenix, AZ, peer-reviewed/refereed. International.
15. Garimella, H. T., & **Kraft, R. H.** (Author Only). (November 2016). "Validation of Embedded Element Method in the Prediction of White Matter Disruption in Concussions," ASME 2016 International Mechanical Engineering Congress & Exposition, The American Society Of Mechanical Engineers, Phoenix, AZ, peer-reviewed/refereed. International.
16. **Kraft, R. H.** (October 2016). "Modeling Axonal Fiber Tracts in the Brain," Invited Speaker, Engineering Science and Mechanics Seminar Series, Penn State University, Department of Engineering Science and Mechanics, University Park, PA. Invited.
17. Yuchi, L., & **Kraft, R. H.** (September 2016). "Progress on Bidirectional Growth Model of Micro-Tissue Engineered Neuronal Networks (micro-TENNs)," Bernstein Conference in Computational Neuroscience, Berlin, Germany.
18. Lee, C., & **Kraft, R. H.** (Author Only). (July 2016). "A Coupled Reaction-Diffusion-Strain Model of Bone Growth in the Cranial Vault," The 12th World Congress on Computational Mechanics WCCM XII & The 6th Asia-Pacific Congress on Computational Mechanics APCOM VI, International Association for Computational Mechanics (IACM) and the Korean Society for Computational Mechanics (KSCM), Seoul, Korea.
19. Garimella, H. T., & **Kraft, R. H.** (Author Only). (July 2016). "Modeling the Electromechanical Behavior of Axonal Fiber Bundles," The 12th World Congress on Computational Mechanics WCCM XII & The 6th Asia-Pacific Congress on Computational Mechanics APCOM VI, International Association for Computational Mechanics (IACM) and the Korean Society for Computational Mechanics (KSCM), Seoul, Korea.

20. **Kraft, R. H.** (Presenter & Author), & Garimella, H. T. (July 2016). "Modeling the Mechanics of Axonal Fiber Tracts using the Embedded Element Method," The 12th World Congress on Computational Mechanics WCCM XII & The 6th Asia-Pacific Congress on Computational Mechanics APCOM VI, International Association for Computational Mechanics (IACM) and the Korean Society for Computational Mechanics (KSCM), Seoul, Korea.
21. Lee, C., & **Kraft, R. H.** (Author Only). (June 2016). "A Coupled Reaction-Diffusion-Strain Model of Bone Growth in the Cranial Vault," 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C 2016), National Harbor, MD. Peer-reviewed/refereed.
22. Ranslow, A., & **Kraft, R. H.** (Presenter & Author). (June 2016). "The Development of a "Fuzzy" Yield Envelop for Trabecular Porcine Skull Bone Using Numerical Simulations," 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C 2016), National Harbor, MD. Peer-reviewed/refereed.
23. Hertel, Z. R., Schumacher, S. C., & **Kraft, R. H.** (Author Only). (April 2016). "Implementation of Viscoelasticity into the CTH Marker Method," 2016 Mach Conference, Hopkins Extreme Materials Institute, Annapolis, MD.
24. Ranslow, A. N., & **Kraft, R. H.** (Author Only). (April 2016). "The Computational Characterization of the Multiaxial Failure Response of Trabecular Skull Bone," 2016 Mach Conference, Hopkins Extreme Materials Institute, Annapolis, MD.
25. Motiwale, S., & **Kraft, R. H.** (Author Only). (April 2016). "Understanding Impact Forces to the Brain: Neural Networks based Impact Classification for Head Impacts in Sports," Penn State 13th Annual College of Engineering Research Symposium, Penn State Engineering Graduate Student Council, University Park, PA.
26. **Kraft, R. H.** (March 2016). "Modeling Axonal Fiber Tracts in the Brain," Invited Speaker, Department of Neurosurgery Seminar Series, University of Pennsylvania, Department of Neurosurgery, Philadelphia, PA. Invited.
27. **Kraft, R. H.** (March 2016). "Modeling Axonal Fiber Tracts in the Brain," Invited Speaker, Penn State University, Department of Biomedical Engineering, University Park, PA, . Invited.
28. **Kraft, R. H.** (February 2016). "Modeling Concussions in Sports," Guest Lecture, KINES 497D: Concussion in Athletics: From Brain to Behavior, University Park, PA. Invited.
29. Motiwale, S., Eppler, W., Hollingsworth, D., Hollingsworth, C., Morgenthau, J., & **Kraft, R. H.** (Author Only). (February 2016). "Application of Neural Networks for Filtering Non-Impact Transients Recorded from Biomechanical Sensors," The IEEE International Conference on Biomedical and Health Informatics (BHI), IEEE Engineering in Medicine and Biology Society (IEEE-EMBS), Las Vegas, NV.
30. Sodha, K. B., & **Kraft, R. H.** (November 2015). "Exploration of Miniaturized Kolsky Bar Designs for Testing Soft Material Properties at High Loading Rates using Finite Element Modeling," ASME 2015 International Mechanical Engineering Congress & Exposition, The American Society Of Mechanical Engineers, Houston, TX, peer-reviewed/refereed, Accepted. International.
31. Ranslow, A. N., Thompson, K., Satapathy, S., Radovitsky, R., Shannon, R., & **Kraft, R. H.** (Author Only). (November 2015). "Microstructural Analysis of Porcine Skull Bone Subjected to Impact Loading," ASME 2015 International Mechanical Engineering Congress & Exposition, The American Society of Mechanical Engineers, Houston, TX, peer-reviewed/refereed, published in proceedings, Accepted. International.

32. Garimella, H. T., & **Kraft, R. H.** (November 2015). "Modeling Electromechanical Deficits in the Human Brain," ASME 2015 International Mechanical Engineering Congress & Exposition, The American Society of Mechanical Engineers, Houston, TX, peer-reviewed/refereed, published in proceedings, Accepted. International.
33. **Kraft, R. H.**, & Garimella, H. T. (June 2015). "Embedded Finite Elements for Modeling Traumatic Axonal Injury," 2015 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C2015), Snowbird, Utah. Peer-reviewed/refereed.
34. **Kraft, R. H.** (May 2015). "Modeling Damage in Axonal Fiber Tracts," Biomedical Engineering Seminar Series, New Jersey Institute of Technology, Department of Biomedical engineering, University Heights Newark, New Jersey, . Invited.
35. Lee, C., Richtsmeier, J. T., & **Kraft, R. H.** (Author Only). (April 2015). "A computational model for biomechanical analysis of bone formation in the cranial vault," 1st Pan American Congresses on Computational Mechanics (PANACM), International Association for Computational Mechanics (IACM), Buenos Aires, Argentina, peer-reviewed/refereed. Invited.
36. **Kraft, R. H.**, & Garimella, H. T. (April 2015). "Computational Modeling Of of Axonal Injury Using the Embedded Element Approach," 1st Pan American Congresses on Computational Mechanics (PANACM), International Association for Computational Mechanics (IACM), Buenos Aires, Argentina, peer-reviewed/refereed. Invited.
37. **Kraft, R. H.**, & Fielding, R. A. (April 2015). "Fracture Networks in the Human Calcaneus Due to Impact Loading," 1st Pan American Congresses on Computational Mechanics (PANACM), International Association for Computational Mechanics (IACM), Buenos Aires, Argentina. Peer-reviewed/refereed.
38. **Kraft, R. H.** (April 2015). "Biomechanics of Humans in Extreme Environments," Biomedical Engineering Seminar Series, Pontificia Universidad Catolica de Chile, Department of Structural and Geotechnical Engineering, Biomedical Engineering Group, Chile. Invited.
39. Motiwale, S., & **Kraft, R. H.** (Author Only). (March 2015). "Understanding Impact Forces to the Brain: Neural Networks based Impact Classification for Head Impacts in Sports," Penn State Neuroscience Retreat, Penn State Institute of the Neurosciences, University Park, PA.
40. Lee, C., Tan, X. G., & **Kraft, R. H.** (November 2014). "A Multiscale Computational Model For The Growth of The Cranial Vault In Craniosynostosis," ASME 2014 International Mechanical Engineering Congress & Exposition, The American Society of Mechanical Engineers, Montreal, Canada, peer-reviewed/refereed, published in proceedings, Accepted. International.
41. Garimella, H. T., Yuan, H., Johnson, B. D., Slobounov, S., & **Kraft, R. H.** (Presenter & Author). (November 2014). "Anisotropic Constitutive Model of Human Brain With Intravoxel Heterogeneity of Fiber Orientation Using Diffusion Spectrum Imaging (DSI)," ASME 2014 International Mechanical Engineering Congress & Exposition, The American Society of Mechanical Engineers, Montreal, Canada, peer-reviewed/refereed, published in proceedings, Accepted. International.
42. Fielding, R. A., **Kraft, R. H.**, Tan, X. G., Przekwas, A. J., & Kozuch, C. D. (November 2014). "High Rate Impact to the Human Calcaneus: A Micromechanical Analysis," ASME 2014 International Mechanical Engineering Congress & Exposition, The American Society of Mechanical Engineers, Montreal, Canada, peer-reviewed/refereed, published in proceedings, Accepted. International.

43. Makwana, A. R., Krishna, A. R., Yuan, H., **Kraft, R. H.** (Presenter & Author), Zhou, X., Przekwas, A. J., & Whitley, P. (November 2014). "Towards A Micromechanical Model of Intervertebral Disc degeneration Under Cyclic Loading," ASME 2014 International Mechanical Engineering Congress & Exposition, The American Society Of Mechanical Engineers, Montreal, Canada, peer-reviewed/refereed, published in proceedings, Accepted. International.
44. Lee, C. X., Richtsmeier, J. T., & **Kraft, R. H.** (October 2014). "A Computational Analysis of Bone Formation in the Cranial Vault," The Mid-Atlantic American Physics Society (APS) Meeting, University Park, PA.
45. Lee, C. X., Richtsmeier, J. T., & **Kraft, R. H.** (October 2014). "A Computational Analysis of Bone Formation in the Cranial Vault," The Mid-Atlantic American Physics Society (APS) Meeting, University Park, PA.
46. Fielding, R. A., Tan, X. G., Przekwas, A., & **Kraft, R. H.** (October 2014). "Finite Element Modeling of Impact and Injury to the Lower Extremity," The Mid-Atlantic American Physics Society (APS) Meeting, University Park, PA.
47. Ranslow, A. N., Ziegler, K. A., Satapathy, S. S., Radovitsky, R., & **Kraft, R. H.** (October 2014). "Microstructural Analysis of Porcine Skull Bone Subjected to Impact Loading," The Mid-Atlantic American Physics Society (APS) Meeting, University Park, PA.
48. Garimella, H. T., & **Kraft, R. H.** (October 2014). "Reinforced Composite Based Modeling of Axonal Injury - A Physics Based Approach," The Mid-Atlantic American Physics Society (APS) Meeting, University Park, PA.
49. Garimella, H. T., & **Kraft, R. H.** (October 2014). "Reinforced composite based modeling of axonal injury - A physics based approach," The Mid-Atlantic American Physics Society (APS) Meeting, University Park, PA.
50. Fielding, R. A., & **Kraft, R. H.** (July 2014). "A Micromechanics-based Simulation of Calcaneus Fracture and Fragmentation Due to Impact Loading," 11th. World Congress on Computational Mechanics (WCCM XI), Barcelona, Spain. Peer-reviewed/refereed.
51. **Kraft, R. H.** (January 2014). "Towards a Micromechanics-Based Simulation of Calcaneus Fracture and Fragmentation Due to Impact Loading," Department of Defense, U.S. Army, Aberdeen Proving Ground, MD.
52. **Kraft, R. H.** (October 2013). "Damaged Connectomes: A Physics-Based Method to Degrade Brain Networks," Penn State Center for Neural Engineering, University Park, PA. Invited.
53. Zhang, J., Merkle, A. C., Carneal, C. M., Armiger, R. S., **Kraft, R. H.**, Ward, E. E., Ott, K. A., Wickwire, A. C., Dooley, C. J., Harrigan, T. P., & Roberts, J. C. (September 2013). "Effects of Torso-Borne Mass and Loading Severity on Early Response of the Lumbar Spine under High-Rate Vertical Loading," International Research Council on Biomechanics of Injury, Sweden.
54. **Kraft, R. H.** (September 2013). "The Mechanics and Response of Humans in Extreme Environments," Mechanical and Nuclear Engineering Seminar Series, University Park, PA. Invited.
55. **Kraft, R. H.**, Dagro, A. M., McKee, P. J., Grafton, S. T., Vettel, J., McDowell, K., Vindiola, M., & Merkle, A. C. (April 2013). "Combining the Finite Element Method with Structural Network-based Analysis for Modeling Neurotrauma," 11th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Salt Lake City, UT.

56. **Kraft, R. H.** (April 2013). "The Mechanics and Response of Humans in Extreme Environments," Frontiers of Cyberscience Seminar Series, Penn State University, University Park, PA.
57. **Kraft, R. H.** (November 2012). "Connectome Neurotrauma Mechanics: Combining the Finite Element Method with Structural Network-based Analysis for Modeling Neurotrauma," Joint Materials/Solid Mechanics Seminar Series, Brown University, Providence, RI.
58. **Kraft, R. H.** (March 2012). "Computational Trauma Biomechanics," Applied Physics Laboratory Biomechanics Seminar Series, The Johns Hopkins University, Laurel, MD. Invited.
59. **Kraft, R. H.** (October 2011). "Computational Failure Modeling of Lower Extremities," A Survey of Blast Injury across the Full Landscape of Military Science, NATO-HFM-207. Panel, Halifax, Canada.
60. **Kraft, R. H.** (August 2011). "Spine Modeling Efforts and Opportunities for Future Work," U.S. Army Research Laboratory/U.S. Army Medical Research and Materiel Command Home on Home Workshop, U.S Army Research Laboratory Research Portfolio Showcase, Aberdeen Proving Ground, MD.
61. **Kraft, R. H.** (March 2011). "BrainAid: A Smartphone App for Field-Deployable Multimodal Screening and Detection of Mild Traumatic Brain Injury," Neurodiagnostic for the Battlefield, U.S. Medical Research and Materiel Command, Fort Detrick, MD.
62. **Kraft, R. H.** (March 2011). "BrainAid: A Smartphone App for Field-Deployable Multimodal Screening and Detection of Mild Traumatic Brain Injury," Office of the Surgeon General, San Antonio, TX.
63. **Kraft, R. H.** (November 2010). "A Structural Mechanics-based Approach for Predicting Neural Deficits," Department of Defense/Department of Energy Neural Restoration Workshop at the Center for Neurotechnology Studies of the Potomac Institute for Policy Studies, Arlington, VA.
64. **Kraft, R. H.** (November 2010). "Biomechanical Simulations with Sierra Presto," SIERRA Seminar Series, Sandia National Laboratories, Albuquerque, NM. Invited.
65. Cullen, D. K. (University of Pennsylvania), & **Kraft, R. H.** (October 2010). "Macro- to Micro-Biomechanics of Traumatic Brain Injury," Biomedical Engineering Society Annual Meeting.
66. **Kraft, R. H.** (August 2010). "Recommendations for a Field Deployable Diagnostic Device for Mild Traumatic Brain Injury," Defense and Veterans Brain Injury Center/Combat Casualty Care Research Program of the U.S. Army Medical Research and Materiel Command/National Institutes of Neurological Disorders and Stroke of the National Institute of Health at the Advanced Technology Applications for Combat Casualty Care Conference.
67. **Kraft, R. H.** (August 2010). "A Finite Element-Based Comparative Study Between High Rate Accelerative and Blast-Induced Head Trauma," U.S. Army Research Laboratory's Accelerative Injury Workshop.
68. **Kraft, R. H.** (August 2010). "Development of a Computational Framework for High Rate Injury Biomechanics of Lower Extremities," U.S. Army Research Laboratory's Accelerative Injury Workshop.
69. Cullen, D. K. (University of Pennsylvania), & **Kraft, R. H.** (June 2010). "Determining Trauma-Specific Neuropathology Based on Macro- to Micro-Injury Biomechanics," Neurotrauma Society Annual Meeting.

70. **Kraft, R. H.** (May 2010). "High Rate Computational Brain Injury Biomechanics: Linkages with Simulation-Based Neurophysiology," 1st Annual Ballistic Protection Technologies Workshop.
71. **Kraft, R. H.** (March 2010). "High Rate Computational Brain Injury Biomechanics: Linkages with Simulation-Based Neurophysiology," Department of Defense Brain Injury Computational Modeling Expert Panel Meeting.
72. **Kraft, R. H.** (March 2010). "High Fidelity Computational Injury Biomechanics," The Technical Cooperation Program (TTCP), The Defence Science and Technology Laboratory (DSTL), Porton Down, UK.
73. **Kraft, R. H.** (January 2010). "Multiscale Modeling of Armor Ceramics," American Ceramics Society International Conference and Exposition, Daytona Beach, FL.
74. **Kraft, R. H.** (November 2009). "A Structural Mechanics-Based Approach for Predicting Neural Deficits," Neural Restoration Workshop, Potomac Institute for Policy Studies.
75. **Kraft, R. H.** (October 2009). "Multiscale Modeling of Brittle Materials," Exxon Mobil Research Seminar Series, Exxon Mobil Strategic Research Center, Clinton, NJ. Invited.
76. **Kraft, R. H.** (March 2009). "High-Fidelity Computational Injury Biomechanics," Computational Solid Mechanics Laboratory Seminar Series, Ecole Polytechnique Fedrale de Lausanne (EPFL), Lausanne, Switzerland. Invited.
77. **Kraft, R. H.** (July 2008). "A Micromechanics-Based Multiscale Approach for Simulating Dynamic Crack Propagation," 8th World Congress on Computational Mechanics, Lido Island, Venice, Italy.
78. **Kraft, R. H.** (2007). "Macroscopic Measures of Strength and Damage Computed from Physically-Based Mechanisms at the Micro-Level," American Ceramics Society International Conference and Exposition, Cocoa Beach, FL.
79. **Kraft, R. H.** (2007). "A Parallel Multiscale Model for Brittle Materials using a Finite Element Based Micromechanical Model and Homogenization Theory," American Physics Society Topical Group on Shock Compression of Condensed Matter, Kona, Hawaii.
80. **Kraft, R. H.** (July 2007). "Finite Element Based Modeling of Damage in Brittle Materials: From Micro to Macro," 9th U.S. National Congress on Computational Mechanics, San Francisco, CA.
81. **Kraft, R. H.** (April 2007). "Finite Element Based Micromechanical Modeling of Brittle Materials Under Compressive Loading," 17th US Army Symposium on Solid Mechanics, Baltimore, MD.
82. **Kraft, R. H.** (December 2006). "A Finite Element Based Micromechanical Damage Model for Brittle Materials Under Compressive Loading," École Normale Supérieure, Solid Mechanics Seminar Series, Paris, France.
83. **Kraft, R. H.** (November 2006). "A Finite Element Based Micromechanical Damage Model for Brittle Materials Under Compressive Loading," American Society of Mechanical Engineers International Congress, Orlando, FL.
84. **Kraft, R. H.** (January 2006). "A Computational Framework for Intergranular and Cleavage Fracture," American Ceramics Society International Conference and Exposition.

85. **Kraft, R. H.** (November 2005). "Controlling Microcracking Events in Ceramics: A Grain Boundary Engineering Approach," American Society of Mechanical Engineers International Congress.
86. **Kraft, R. H.** (November 2005). "A Numerical Model for Intergranular and Cleavage Fracture in Ceramic Materials," MRS Fall Meeting, Boston, MA.
87. **Kraft, R. H.** (May 2003). "Optimization of a dynamic hardness test methodology," Impact Physics Branch Seminar Series, U.S. Army Research Laboratory.

## Postdoctoral Fellows

Toma Marinov, "Computational Neuroscience: Simulation of Micro-Tissue Engineered Neural Networks." Postdoctoral Research Supervision (September 2016 - present)

## Former Doctoral Students

Harsha Garimella, "An Embedded Element Based Human Head Model to Investigate Axonal Injury." Thesis Advising (September 2013 - June 2017)

Chanyoung Lee, "A Computational Analysis of Bone Formation in the Cranial Vault using a Reaction-Diffusion-Strain Model." Thesis Advising (December 2013 – May 2018)

## Current Doctoral Students

Zacarie Hertel, "An Exploration of the Material Point Method (MPM) in CTH Applied to Soft Material Systems Subjected to Dynamic Loading." Thesis Advising (January 2015 - present)

Vikram Subramani, "Modeling of Spinal Biomechanics in Extreme Conditions." Thesis Advising (November 2016- present)

Thomas Hannah, "High Strain Rate Modeling and Experiments of Dyneema Composites." Thesis Advising (October 2017 - present)

## Supervised Master Students

Ritika Menghani, "Application of a History-Dependent Damage Model for the Brain due to Repetitive Impacts." Thesis Advising (January 2018 – present)

Jesse Gerber, "Development of a History-Dependent Damage Model for the Brain due to Repetitive Impacts." Thesis Advising (August 2016 – May 2018)

Anjali Dhobale, "Assessing Functional Connectivity of Micro-Tissue Engineered Neural Networks using Calcium Fluorescence Imaging." Thesis Advising (August 2016 - May 2017)

Liang Yuchi, "A Computational Model of Bidirectional Growth for Micro-Tissue Engineered Neuronal Networks (micro-TENNs)." Thesis Advising (August 2016 - May 2017)

Ziwen Fang, "MPM Methods for Modeling Trabecular Bone." Thesis Advising (August 2016 - May 2017)

Shruti Motiwale, "Modeling Intervertebral Disc Degeneration due to Cyclic Loading." Thesis Advising (January 2015 - May 2016)

Allison Ranslow, "Microstructural Analysis of Porcine Skull Bone Subjected to Impact Loading." Thesis Advising (July 2014 - May 2016)

Rebecca Fielding, "Development of a lower extremity model for high strain rate impact loading." Thesis Advising (September 2013 - May 2015)

### Supervised Undergraduate Students with Co-Authorship or Thesis

Patricia De Tomas-Medina, "Modeling the Response of Neurons Subjected to High Rate Deformation: Comparing Simulations to Experimental Results." Honors Thesis Advisor (January 2015 – May 2018)

Patrick Casey, "Mechanical Design of Hip Implant Tools." Honors Thesis Advisor (August 2017 – May 2018)

Marisa Borusiewicz, "Quantifying the Structure of Micro-Tissue Engineered Neural Networks." Honors Thesis Advisor (August 2016 - May 2017)

Christopher Kozuch, "Modeling Dynamic Fracture in Bones." Supervised Research (September 2013 - May 2016)

Kush Sodha, "Estimating Dynamic Properties for Biological Materials: Design, Development, and Calibration of a Desktop Miniaturized Double-Lap Shear Kolsky Bar." Honors Thesis Advisor (September 2014 - May 2016)

Michael Robinson, "The Development of an Anatomically Correct Model of Calcaneus Fracture and Fragmentation Due to Impact Loading." Honors Thesis Advisor (September 2013 - May 2015)

### Teaching

Pennsylvania State University

2018/Spring	Introduction to Modern Computational Tools, ME 497
2018/Spring	Nonlinear Finite Elements, ME 563
2017/ Fall	Finite Elements in Engineering, ME 461
2017/ Summer	Finite Elements in Engineering, ME 461
2017/Spring	Finite Elements in Engineering, ME 461
2017/Spring	Nonlinear Finite Elements, ME 563
2016/Fall	Senior Capstone Design, ME 440
2016/Spring	Finite Elements in Engineering, ME 461
2016/Spring	Nonlinear Finite Elements, ME 563
2015/Fall	Finite Elements in Engineering, ME 461
2015/Spring	Nonlinear Finite Elements, ME 563
2014/Fall	Mechanical Design, ME 360
2014/Spring	Nonlinear Finite Elements, ME 563
2013/Fall	Mechanical Design, ME 360

### Sponsored Research

Title: Development of a Novel Ballistic Armor Concept using FEM

Role: Principal Investigator, Contract

Dates: July 24, 2017 - January 31, 2019

Funding: \$108,917

Source of Support: Los Alamos National Laboratory, Federal Laboratories

Title: Synchronizing Video Imagery with Wearable Sensor Data and Side-by-Side Modeling Software to Develop Healthy Habits in Children

Role: Principal Investigator, Contract

Dates: July 2016 - December 2017

Funding: \$132,750



Source of Support: National Science Foundation (subcontract from CoachSafe PlaySafe, LLC), Federal  
Title: Global-Local Modeling of Aircraft Occupant Safety Assessment during Ejection (Air Force Phase I SBIR)

Role: Principal Investigator, Contract

Dates: August 2016 - February 2017).

Funding: \$22,000

Source of Support: U.S. Air Force (Subcontract from CFD Research Corporation), Federal

Title: Craniosynostosis Network: From Skull Shape to Cell Activity in Coronal Craniosynostosis

Role: Co-Principal Investigator, Grant

Dates: February 2015 - August 2020

Funding: \$1,490,704

Source of Support: National Institutes of Health, Federal

Title: BRAIN Initiative: Biological 'Living Electrodes' Using Tissue Engineered Axonal Tracts to Probe and Modulate the Nervous System

Role: Co-Principal Investigator, Grant

Dates: September 2015 - August 2018

Funding: \$365,831

Source of Support: National Institutes of Health, Federal

Title: Phase II STTR: A Neck Injury Assessment Tool for Prolonged Wear of Head Supported Mass

Role: Principal Investigator, Grant

Dates: February 2015 - February 2017

Funding: \$140,000

Source of Support: DoD/CFD Research Corporation, Federal

Title: Phase II STTR: Physics and Physiology Based Human Body Model of Blast Injury and Protection

Role: Principal Investigator, Grant

Dates: February 2015 - February 2017

Funding: \$200,000

Source of Support: DoD/CFD Research Corporation, Federal

Title: Microstructural Analysis of Porcine Skull Bone Subjected to Impact Loading

Role: Principal Investigator, Grant

Dates: July 2014 - December 2016

Funding: \$200,000

Source of Support: Army Research Office; sub-contract from Massachusetts Institute of Technology, Federal

Title: Continuation: An Exploration of the Material Point Method (MPM) in CTH Applied to Soft Material Systems Subjected to Dynamic Loading

Role: Principal Investigator, Sponsored Research

Dates: January 2017 - December 2019

Funding: \$309,692

Source of Support: DoE/Sandia National Laboratory, Federal Laboratories

Title: Embedded Finite Elements for a Multiscale, Multifunctional Approach for Modeling Axonal Bundles

Role: Principal Investigator, Sponsored Research

Dates: January 2017 - December 2018).

Funding: \$226,857

Source of Support: Army Research Laboratory, Federal

Title: An Exploration of the Material Point Method (MPM) in CTH Applied to Soft Material Systems Subjected to Dynamic Loading

Role: Principal Investigator, Sponsored Research

Dates: January 2015 - January 2017

Funding: \$190,644

Source of Support: DoE/Sandia National Laboratory, Federal Laboratories

Title: Big Data Sorting: Stream of Consciousness Using Labels, Language and Speech (SCULLS)

Role: Principal Investigator, Sponsored Research

Dates: September 2014 - May 2015

Funding: \$50,000

Source of Support: PSU CoE Cyberhealth Initiative (funding comes from Tobacco CURE initiative)

Title: Phase I STTR: A Neck Injury Assessment Tool for Prolonged Wear of Head Supported Mass

Role: Principal Investigator, Sponsored Research

Dates: October 2013 - March 2014

Funding: \$18,568

Source of Support: DoD/CFD Research Corporation

Title: Phase I STTR: Physics and Physiology Based Human Body Model of Blast Injury and Protection

Role: Principal Investigator, Sponsored Research

Dates: October 2013 - March 2014

Funding: \$36,000

Source of Support: DoD/CFD Research Corporation

Title: Global-Local Modeling of Aircraft Occupant Safety Assessment during Ejection (Air Force Phase II SBIR)

Role: Principal Investigator, Other

Dates: August 2017 – July 2019

Funding: \$264,122

Source of Support: DoD/CFD Research Corporation

Title: Development of Commercial Tools for Brain Modeling

Role: Principal Investigator, Other

Dates: August 15, 2017 - August 15, 2018

Funding: \$100,637

Source of Support: CFD Research Corporation, Corporations