

NAME: Steven Abramowitch

POSITION TITLE & INSTITUTION: Assistant Professor, University of Pittsburgh

A. PROFESSIONAL PREPARATION - (see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Pittsburgh	Pittsburgh, PA	Applied Mathematics	BS	1998
University of Pittsburgh	Pittsburgh, PA	Bioengineering	PhD	2004

B. APPOINTMENTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2015 - Current	Associate Professor w/ Tenure (Primary), Bioengineering, University of Pittsburgh, Pittsburgh PA
2015 - Current	Associate Professor (Secondary), Obstetrics, Urogynecology, and Reproductive Sciences, University of Pittsburgh, Pittsburgh PA
2007 - 2015	Assistant Professor (Primary), Bioengineering, University of Pittsburgh, Pittsburgh PA
2007 - Current	Assistant Professor (Secondary), Obstetrics, Urogynecology, and Reproductive Sciences, University of Pittsburgh, Pittsburgh PA
2004 - 2007	Research Assistant Professor, University of Pittsburgh, Pittsburgh PA

C. PRODUCTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#)) Products Most Closely Related to the Proposed Project

Dr. Abramowitch is the author of over 60 refereed journal articles, 25 refereed conference papers, 7 book chapters, and over 204 conference abstracts. As of 9/2/2020, his publications have received 5000 citations and his h-index was 37.

5 products that are most closely related to the current proposal

1. Routzong M.R., Rostaminia G., Bowen S.T., Goldberg R.P., Abramowitch S.D. Statistical Shape Modeling of the Pelvic Floor to Evaluate Women with Obstructed Defecation Symptoms. *Computer Methods in Biomechanics and Biomedical Engineering*. Accepted. August 2020.

2. Routzong M.R., Rostaminia G., Moalli P.A., Abramowitch S.D. Pelvic Floor Shape Variations During Pregnancy and After Vaginal Delivery. *Comput Methods Programs Biomed*. E-Pub ahead of Print. 2020. PMID: 32473515

3. Rostaminia G., Routzong M., Chang C., Goldberg R.P., Abramowitch S.D. Motion of the Vaginal Apex During Strain and Defecation. *Int Urogynecol J*. 31(2) pp. 391-400, 2020. PMID: 31161247

4. Routzong M.R., Moalli P.A., Maiti S., De Vita R., Abramowitch S.D. Novel Simulations to Determine the Impact of Superficial Perineal Structures on Vaginal Delivery. *InterFace Focus*. 9(4), pp. 20190011, 2019. PMID: 31263532

5. Feola, A.J., Moalli, P.M., Alperin, M., Duerr, R., Gandley, R.E., Abramowitch, S.D. Impact of Pregnancy and Vaginal Delivery on the Passive and Active Mechanics of the Rat Vagina. *Annals of Biomedical Engineering*, 39 (1), 549-58, 2010. PMID: 20824342

Other Significant Products, Whether or Not Related to the Proposed Project

1. Knight K.M., Moalli P.A., Abramowitch S.D. Preventing Mesh Pore Collapse by Designing Mesh Pores with Auxetic Geometries. *J Biomech Eng.* 140(5), pp. 051005, 2018 PMID: 29350744
2. Barone W.R., Knight K.M., Moalli P.A., Abramowitch, S.D. Deformation of Transvaginal Mesh in Response to Multiaxial Loading. *Journal of Biomechanical Engineering.* 141(2), pp. 021001, 2019. PMID: 30347035
3. Knight, K.M., Moalli, P.A., Nolfi, A., Palcsey, S., Barone, W.R., Abramowitch, S.D. Impact of Parity on Ewe Vaginal Mechanical Properties Relative to the Nonhuman Primate and Rodent. *Int Urogynecol J Pelvic Floor Dysfunct.* 27(8), pp. 1255-63, 2016. PMID: 26872644
4. Barone, W.R., Amini, R., Moalli, P.A., Maiti, S., Abramowitch, S.D. The Impact of Boundary Conditions on Surface Curvature of Polypropylene Mesh in Response to Uniaxial Loading. *J. Biomech.* 48(9), pp. 1566-1574, 2015. PMID: 25843260

D. SYNERGISTIC ACTIVITIES - (see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

Educational Outreach

Director, University of Pittsburgh, Bioengineering Educational Outreach (formerly NSF-ERC Funded) Middle & High School Summer Camps. The overall goal of this program is to reach underserved minority middle school students, and to actively engage them in the wonders of science at a critical crossroads of their education through a connective, informal science one-week education experience.

Co-PI and Co-Director of two NSF funded programs: 1) AGEP-KAT: Adopting Evidence Based Strategies to Improve Academic Climate and the Success of Underrepresented Doctoral Students in Engineering aims to improve faculty engagement with underrepresented students, advancing their awareness of the barriers and problems the student experience and 2) Global Engineering Preparedness Scholarship (GEPS) Program which prepares low income students to become engineers with the skills required to be part of a global engineering workforce.

NSF BIOGRAPHICAL SKETCH

NAME: ATESHIAN, GERARD

POSITION TITLE & INSTITUTION: Andrew Walz Professor of Mechanical Engineering, Columbia University

(a) PROFESSIONAL PREPARATION

INSTITUTION	LOCATION	MAJOR / AREA OF STUDY	DEGREE (if applicable)	YEAR YYYY
Columbia University	New York, NY	Mechanical Engineering	BS	1986
Columbia University	New York, NY	Mechanical Engineering	MS	1987
Columbia University	New York, NY	Mechanical Engineering	MPHIL	1990
Columbia University	New York, NY	Mechanical Engineering	PHD	1991

(b) APPOINTMENTS

- 2013 - present Andrew Walz Professor of Mechanical Engineering, Columbia University, New York, NY
- 2002 - present Professor of Biomedical Engineering, Columbia University, New York, NY
- 1996 - present Director, Musculoskeletal Biomechanics Laboratory, Columbia University, New York, NY
- 2011 - 2014 Chair, Department of Mechanical Engineering, Columbia University, New York, NY
- 2002 - 2013 Professor of Mechanical Engineering, Columbia University, New York, NY
- 1999 - 2002 Vice Chair, Department of Biomedical Engineering, Columbia University, New York, NY
- 1999 - 2002 Associate Director, Orthopaedic Research Laboratory, Columbia-Presbyterian Medical Center, New York, NY
- 1998 - 2002 Associate Professor of Biomedical Engineering, Columbia University, New York, NY
- 1996 - 2002 Associate Professor of Mechanical Engineering, Columbia University, New York, NY
- 1991 - 2002 Associate in Orthopaedic Research, Columbia-Presbyterian Medical Center, New York, NY
- 1991 - 1995 Assistant Professor of Mechanical Engineering, Columbia University, New York, NY

(c) PRODUCTS

Products Most Closely Related to the Proposed Project

1. Ateshian GA. The role of interstitial fluid pressurization in articular cartilage lubrication. J Biomech. 2009 Jun 19;42(9):1163-76. PubMed Central PMCID: [PMC2758165](#).
2. Durney KM, Shaeffer CA, Zimmerman BK, Nims RJ, Oungoulian S, Jones BK, Boorman-Padgett JF, Suh JT, Shah RP, Hung CT, Ateshian GA. Immature bovine cartilage wear by fatigue failure and delamination. J Biomech. 2020 Jun 23;107:109852. PubMed Central PMCID: [PMC7809915](#).
3. Maas SA, Ellis BJ, Ateshian GA, Weiss JA. FEBio: finite elements for biomechanics. J Biomech Eng. 2012 Jan;134(1):011005. PubMed Central PMCID: [PMC3705975](#).
4. Shim JJ, Maas SA, Weiss JA, Ateshian GA. A Formulation for Fluid Structure-Interactions in

FEBio Using Mixture Theory. J Biomech Eng. 2019 Mar 5; PubMed Central PMCID: [PMC6528685](#).

5. Zimmerman B, Nims R, Chen A, Hung CT, Ateshian GA. Direct Osmotic Pressure Measurements in Articular Cartilage Demonstrate Non-Ideal and Concentration-Dependent Phenomena. J Biomech Eng. 2020 Nov 19; PubMed Central PMCID: [PMC7872001](#).

Other Significant Products, Whether or Not Related to the Proposed Project

1. Ateshian GA, Lai WM, Zhu WB, Mow VC. An asymptotic solution for the contact of two biphasic cartilage layers. J Biomech. 1994 Nov;27(11):1347-60. PubMed PMID: [7798285](#).
2. Ateshian GA, Warden WH, Kim JJ, Grelsamer RP, Mow VC. Finite deformation biphasic material properties of bovine articular cartilage from confined compression experiments. J Biomech. 1997 Nov-Dec;30(11-12):1157-64. PubMed PMID: [9456384](#).
3. Cohen ZA, McCarthy DM, Kwak SD, Legrand P, Fogarasi F, Ciaccio EJ, Ateshian GA. Knee cartilage topography, thickness, and contact areas from MRI: in-vitro calibration and in-vivo measurements. Osteoarthritis Cartilage. 1999 Jan;7(1):95-109. PubMed PMID: [10367018](#).
4. Mauck RL, Soltz MA, Wang CC, Wong DD, Chao PH, Vallmu WB, Hung CT, Ateshian GA. Functional tissue engineering of articular cartilage through dynamic loading of chondrocyte-seeded agarose gels. J Biomech Eng. 2000 Jun;122(3):252-60. PubMed PMID: [10923293](#).
5. Soltz MA, Ateshian GA. Experimental verification and theoretical prediction of cartilage interstitial fluid pressurization at an impermeable contact interface in confined compression. J Biomech. 1998 Oct;31(10):927-34. PubMed PMID: [9840758](#).

(d) SYNERGISTIC ACTIVITIES

1. Introduced four graduate-level courses in the area of musculoskeletal and soft tissue biomechanics.
2. Supervised 67 undergraduate, 49 masters, and 33 doctoral students in research projects.
3. Contributed to the establishment of a new department of biomedical engineering at Columbia and served as its vice-chair.
4. Co-organized four bioengineering conferences and served on the executive committee of the Bioengineering Division of ASME.
5. Served as program director on a NIH T32 pre-doctoral training grant for multidisciplinary engineering training in musculoskeletal research.

NAME: Elham Azizi

POSITION TITLE & INSTITUTION: Assistant Professor, Columbia University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Sharif University of Technology	Tehran, Iran	Electrical Engineering	B.S.	2008
Boston University	Boston, US	Electrical Engineering	M.S.	2010
Boston University	Boston, US	Bioinformatics	Ph.D.	2014
Columbia University	New York, US	Computational Biology	Postdoc Fellow	2016
Memorial Sloan Kettering Cancer Center	New York, US	Computational Biology	Postdoc Fellow	2019

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2020 - Present	Herbert & Florence Irving Assistant Professor of Cancer Data Research, Irving Institute for Cancer Dynamics, Columbia University, New York, NY
2020 - Present	Assistant Professor, Biomedical Engineering Department, Columbia University, New York, NY
2020 - Present	Affiliated Faculty, Department of Computer Science, Columbia University, New York, NY
2020 - Present	Affiliated Member, Data Science Institute, Columbia University, New York, NY

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Bachireddy* P, Azizi* E, Burdziak C, Nguyen VN, Ennis C, Choo Z-N, Li S, Livak K, Neuberg DS, Soiffer RJ, Ritz J, Alyea E, Pe'er D, Wu CJ. Mapping the evolution of T cell states during response and resistance to adoptive cellular therapy. under revision in Cancer Cell. BioRxiv preprint 2020: <https://doi.org/10.1101/2020.07.08.194332>.
2. Burdziak* C, Azizi* E, Prabhakaran S, & Pe'er D. A Nonparametric Multi-view Model for Estimating Cell Type-Specific Gene Regulatory Networks. arXiv preprint arXiv:1902.08138. 2019.
3. Azizi* E, Carr* AJ, Plitas* G, Cornish* AE, Konopacki C, Prabhakaran S, Nainys J, Wu K, Kiseliovas V, Setty M, Choi K, Fromme, R.M., Dao P, McKenney P.T., Wasti, R.C., Kadaveru, K., Mazutis L, Rudensky AY, Pe'er D, Single-cell Map of Diverse Immune Phenotypes in the Breast Tumor Microenvironment, Cell 174 (5): 1293-1308, 2018.
4. Prabhakaran* S, Azizi* E, Carr A, Pe'er D. Dirichlet Process Mixture Model for Correcting Technical Variation in Single-Cell Gene Expression Data. Proceedings of Machine Learning Research, W&CP (ICML). 2016; 48:1070–1079.
5. Azizi E, Airoidi EM, Galagan JE. Learning Modular Structures from Network Data and Node Variables. Proceedings of Machine Learning Research, W&CP (ICML). 2014; 32:1440-1448.

Other Significant Products, Whether or Not Related to the Proposed Project

1. Jin Y*, Toberoff A*, Azizi E, Transfer learning framework for cell segmentation with incorporation of geometric features, LMRL Workshop at NeurIPS, 2020.
2. Price JC, Azizi E, Naiche LA , Parvani JG , Shukla P, Kim S, Slack-Davis JK, Pe'er D, Kitajewski JK, Notch3 signaling promotes tumor cell adhesion and progression in a murine epithelial ovarian cancer model. PLoS One. 2020; 15(6):e0233962. PubMed PMID: 32525899.
3. Hemmers S, Schizas M, Azizi E, Dikiy S, Zhong Y, Feng Y, Altan-Bonnet G. and Rudensky AY, 2019. IL-2 production by self-reactive CD4 thymocytes scales regulatory T cell generation in the thymus. Journal of Experimental Medicine, pp.jem-20190993.

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

1. Instructor for a new course “Statistical Machine Learning in Genomics”, Columbia University, Fall 2020.
2. Initiated and co-organized the annual Workshop on Computation Biology at the International Conference in Machine Learning (ICML) in NYC 2016, Sydney 2017, Stockholm 2018, Long Beach 2019, virtual 2020.; Chair, Contributed Session on Bayesian Applications in Genetics, NESS 2014.
3. Moderator, ASHG Session on Understanding tumor heterogeneity from single cell sequencing of genomes, transcriptomes and epigenome, Oct 2018.
4. Mentor, 1000 Girls, 1000 Futures Program, Global STEM Alliance of the New York Academy of Sciences, 2016.
5. Reviewer & Event Coord., 1st Annual Women in Science @ Columbia Graduate Research Symposium, 2016.

NAME: Philip V. Bayly, PhD

POSITION TITLE & INSTITUTION: Professor & Chair, Mechanical Engineering; Washington University

A. PROFESSIONAL PREPARATION - (see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Dartmouth College	New Hampshire	Engineering Science	A.B.	1986
Brown University	Rhode Island	Engineering	M.S.	1987
Duke University	North Carolina	Mechanical Engineering	Ph.D.	1993

B. APPOINTMENTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2008-present	Chair, Mechanical Engineering & Materials Science; Washington University in St. Louis, MO
2003-present	Professor, Biomedical Engineering (joint); Washington University in St. Louis, MO
2003-present	Professor, Mechanical Engineering (primary); Washington University in St. Louis, MO
1999-2002	Associate Professor, Biomedical Engineering; Washington University in St. Louis, MO
1999-2002	Associate Professor, Mechanical Engineering; Washington University in St. Louis, MO
1993-1999	Assistant Professor, Mechanical Engineering; Washington University in St. Louis, MO
1993	Assistant Research Professor, Mechanical Engineering; Duke University, Durham, NC
1989-1990	Engineer, Technical Systems and Advanced Products; Pitney Bowes, Inc., Stamford, CT
1988-1989	Research Engineer, Prosthetics and Orthotics; Shriners Hospital, Springfield, MA

C. PRODUCTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#)) Products Most Closely Related to the Proposed Project

Guertler CA, Okamoto RJ, Ireland JA, Pacia CP, Garbow JR, Chen H, Bayly PV. Estimation of Anisotropic Material Properties of Soft Tissue by MRI of Ultrasound-Induced Shear Waves. *J Biomech Eng.* 2020 Mar 1;142(3):0310011–03100117. doi: 10.1115/1.4046127.

Hou Z, Okamoto RJ, Bayly PV. Shear Wave Propagation and Estimation of Material Parameters in a Nonlinear, Fibrous Material. *J Biomech Eng.* 2020 May 1;142(5):0510101–05101010. doi: 10.1115/1.4044504.

Schmidt JL, Tweten DJ, Benegal AN, Walker CH, Portnoi TE, Okamoto RJ, Garbow JR, Bayly PV. Magnetic resonance elastography of slow and fast shear waves illuminates differences in shear and tensile moduli in anisotropic tissue. *J Biomech.* 2016 May 3;49(7):1042-1049. doi: 10.1016/j.jbiomech.2016.02.018.

Tweten DJ, Okamoto RJ, Schmidt JL, Garbow JR, Bayly PV. Estimation of material parameters from slow and fast shear waves in an incompressible, transversely isotropic material. *J Biomech.* 2015 Nov 26;48(15):4002-4009. doi: 10.1016/j.jbiomech.2015.09.009.

Namani R, Feng Y, Okamoto RJ, Jesuraj N, Sakiyama-Elbert SE, Genin GM, Bayly PV. Elastic characterization of transversely isotropic soft materials by dynamic shear and asymmetric indentation. *J Biomech Eng.* 2012 Jun;134(6):061004. doi: 10.1115/1.4006848. (2013 Richard Skalak Best Paper Award from the Journal of Biomechanical Engineering).

Other Significant Products, Whether or Not Related to the Proposed Project

Hou Z, Bayly PV, Okamoto RJ. Shear wave speeds in nearly-incompressible fibrous materials with two fiber families. *J Acoust Soc Am*. 2021 Feb;149(2):1097. doi: 10.1121/10.0003528.

Schmidt JL, Tweten DJ, Badachhape AA, Reiter AJ, Okamoto RJ, Garbow JR, Bayly PV. Measurement of anisotropic mechanical properties in porcine brain white matter ex vivo using magnetic resonance elastography. *J Mech Behav Biomed Mater*. 2018 Mar;79:30-37. doi: 10.1016/j.jmbbm.2017.11.045.

Tweten DJ, Okamoto RJ, Bayly PV. Requirements for accurate estimation of anisotropic material parameters by magnetic resonance elastography: A computational study. *Magn Reson Med*. 2017 Dec;78(6):2360-2372. doi: 10.1002/mrm.26600.

Namani R, Wood MD, Sakiyama-Elbert SE, Bayly PV. Anisotropic mechanical properties of magnetically aligned fibrin gels measured by magnetic resonance elastography. *J Biomech*. 2009 Sep 18;42(13):2047-53. doi: 10.1016/j.jbiomech.2009.06.007.

Kroenke CD, Taber EN, Leigland LA, Knutsen AK, Bayly PV. Regional patterns of cerebral cortical differentiation determined by diffusion tensor MRI. *Cereb Cortex*. 2009 Dec;19(12):2916-29. doi: 10.1093/cercor/bhp061.

D. SYNERGISTIC ACTIVITIES - (see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

Associate Editor: *J Biomechanical Engineering* (2003-2009), *J Vibration and Acoustics* (2009-2015)
Reviewer: *Biophysical Journal*; *PNAS*; *J Biomechanical Engineering*; *J Biomechanics*; *Intl J of Nonlinear Mechanics*; *J Sound and Vibration*; *J Vibration and Acoustics*; *J Dynamic Systems, Measurement, and Control*; *IEEE Transactions on Biomedical Engineering*; *J Applied Mechanics*; *Annals of Biomedical Engineering*; *J Neurotrauma*; *Proc. Roy. Soc. London – Interface*.
Proposal Review Panelist: National Science Foundation; National Institutes of Health.

Research Mentoring of K-12, Undergraduate and Graduate Students:
- Youth University Summer Outreach Program (K-12, 2008-present)
- Washington University Summer Engineering Fellowship (UG, 2015–present)
Total number of PhD students advised: 22
Total number of postdoctoral scholars sponsored: 8

Chair, Washington University Faculty Committee on Technology Transfer (2020-present)

NAME: Bello, Natalie

POSITION TITLE & INSTITUTION: Assistant Professor of Medicine, Columbia University Medical Center

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Cornell University	Ithaca, NY	Biology, conc. genetics	BA	1999
University of Rochester School of Medicine and Dentistry	Rochester, NY		MD	2005
Harvard School of Public Health	Boston, MA	Clinical Effectiveness	MPH	2014
NYPH-Columbia University Medical Center	New York, NY	Internal Medicine Residency & Chief Resident	Resident	2005-2009
Beth Israel Deaconess Medical/Harvard Medical School	Boston, MA	Cardiology Fellowship	Fellow	2009-2012
Beth Israel Deaconess Medical/Harvard Medical School	Boston, MA	T32 Fellowship	NIH Training Grant	2012-2014

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2014 - Present	Assistant Professor of Medicine, Columbia University Medical Center, New York, NY
2012 - 2014	Post-doctoral Research Fellow in Cardiology, Beth Israel Deaconess Medical Center and Brigham and Women's Hospital/Harvard Medical School, Boston, MA
2012 - 2014	Instructor in Medicine, Harvard Medical School, Boston, MA
2011 - 2012	Chief Cardiology Fellow, Beth Israel Deaconess Medical Center/Harvard Medical School, Boston, MA
2009 - 2012	Cardiovascular Medicine Fellow, Beth Israel Deaconess Medical Center/Harvard Medical School, Boston, MA
2008 - 2009	Chief Resident in Internal Medicine, New York Presbyterian Hospital-Columbia University Medical Center, New York, NY
2005 - 2008	Internal Medicine Resident, New York Presbyterian Hospital-Columbia University, New York, NY
1999 - 2001	Senior Research Assistant, Department of Urology, Columbia University, New York, NY

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Muntner P, Einhorn PT, Cushman WC, Whelton PK, Bello NA, Drawz PE, Green BB, Jones DW, Juraschek SP, Margolis KL, Miller ER 3rd, Navar AM, Ostchega Y, Rakotz MK, Rosner B, Schwartz JE, Shimbo D, Stergiou GS, Townsend RR, Williamson JD, Wright JT Jr, Appel LJ. Blood Pressure Assessment in Adults in Clinical Practice and Clinic-Based Research: JACC Scientific Expert Panel. *J Am Coll Cardiol*. 2019 Jan 29;73(3):317-335. PubMed Central PMCID: PMC6573014.
2. Bello N, Mosca L. Epidemiology of coronary heart disease in women. *Prog Cardiovasc Dis*. 2004 Jan-Feb;46(4):287-95. PubMed PMID: 14961452.
3. Bello NA, Cheng S, Claggett B, Shah AM, Ndumele CE, Roca GQ, Santos AB, Gupta D, Vardeny O, Aguilar D, Folsom AR, Butler KR, Kitzman DW, Coresh J, Solomon SD. Association of Weight and Body Composition on Cardiac Structure and Function in the ARIC Study (Atherosclerosis Risk in Communities). *Circ Heart Fail*. 2016 Aug;9(8) PubMed Central PMCID: PMC5218510.
4. Bello NA, Schwartz JE, Kronish IM, Oparil S, Anstey DE, Wei Y, Cheung YKK, Muntner P, Shimbo D. Number of Measurements Needed to Obtain a Reliable Estimate of Home Blood Pressure: Results From the Improving the Detection of Hypertension Study. *J Am Heart Assoc*. 2018 Oct 16;7(20):e008658. PubMed Central PMCID: PMC6474964.

Other Significant Products, Whether or Not Related to the Proposed Project

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

1. Hypertension. I am a clinician scientist with a program of investigation focused on elucidating and ameliorating the short- and long-term maternal cardiovascular effects of hypertensive disorders of pregnancy. I have extensive training in epidemiology, biostatistics, cardiac imaging, and clinical trials.
2. Heart Failure with Reduced and Preserved Ejection Fraction. Over the past nine years, I have been involved in the conduct of clinical trials and epidemiological cohorts designed to examine pathophysiologic mechanisms and test therapies of heart failure with reduced and preserved ejection failure.
3. Peripartum Cardiomyopathy. I have examined the relationship between preeclampsia, a hypertensive disorder of pregnancy, and peripartum cardiomyopathy, a devastating form of systolic heart failure that affects women at the end of pregnancy and in the early post-partum period.

NAME: Naomi C. Chesler

POSITION TITLE & INSTITUTION: Professor, University of California, Irvine

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Swarthmore College	Swarthmore, PA	Engineering	B.S.	1989
Massachusetts Institute of Technology	Cambridge, MA	Mechanical Engineering	M.S.	1991
Harvard-MIT Health Science and Technology	Boston, MA Cambridge, MA	Medical Engineering	Ph.D	1996

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2020 - Present	Director of Edwards Lifesciences Center for Advanced Cardiovascular Technology, University of California, Irvine, Irvine, CA
2020 - Present	Professor, Dept. of Biomedical Engineering, University of California, Irvine, Irvine, CA
2002 - 2020	Assistant, Associate and Full Professor, Dept. of Biomedical Engineering, University of Wisconsin - Madison; Courtesy appointments in Educational Psychology and Medicine, Madison, Wisconsin
1998 - 2002	Assistant Professor, Dept. of Mechanical Engineering, University of Vermont, Burlington, VT
1996 - 1998	Post-Doctoral Research Fellow, Georgia Institute of Technology, Atlanta, GA

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Frump, Albrecht, Yakubov, Breuils-Bonnet, Nadeau, Tremblay, Potus, Omura, Cook, Fisher, Rodriguez, Brown, Stenmark, Rubinstein, Krentz, Tabima, Li, Sun, Chesler, Provencher, Bonnet, and Lahm, 17beta-Estradiol and estrogen receptor alpha protect right ventricular function in pulmonary hypertension via BMPR2 and apelin. *J Clin Invest*, 2021. 131(6).
2. Philip, Tabima, Wolf, Frump, Cheng, Schreier, Hacker, Lahm, and Chesler, Exogenous Estrogen Preserves Distal Pulmonary Arterial Mechanics and Prevents Pulmonary Hypertension in Rats. *Am J Respir Crit Care Med*, 2020. 201(3): p. 371-374.
3. Mulchrone, Bellofiore, Douwes, Duong, Beshish, Barton, Francois, Eldridge, Goss, and Chesler, Impaired Right Ventricular-Vascular Coupling in Young Adults Born Preterm. *Am J Respir Crit Care Med*, 2020. 201(5):p. 615-618.
4. Cheng, Philip, Tabima, Kumari, Yakubov, Frump, Hacker, Bellofiore, Li, Sun, Goss, Lahm, and Chesler, Estrogen receptor-alpha prevents right ventricular diastolic dysfunction and fibrosis in female rats. *Am J Physiol Heart Circ Physiol*, 2020. 319(6): p. H1459-H1473.
5. Philip, Murphy, Schreier, Stevens, Tabima, Albrecht, Frump, Hacker, Lahm, and Chesler, Pulmonary vascular mechanical consequences of ischemic heart failure and implications for right ventricular function. *Am J Physiol Heart Circ Physiol*, 2019. 316(5): p. H1167-H1177.

Other Significant Products, Whether or Not Related to the Proposed Project

1. Chesler NC. A How-To guide for promoting diversity and inclusion in biomedical engineering. *Annals of Biomedical Engineering*. 2019.
2. Chesler NC, Ruis AR, Collier W, Swiecki Z, Arastoopour G and Shaffer DW. A Novel Paradigm for Engineering Education: Virtual internships with individualized mentoring and automated assessment of engineering thinking. *Journal of Biomechanical Engineering*. 2015.
3. Arastoopour, G, Chesler, NC & Shaffer, DW. Epistemic Persistence: A Simulation-Based Approach to Increasing Participation of Women in Engineering. *Journal of Women and Minorities in Science and Engineering*. 2014.
4. Nelson, R., Chesler, N.C. and Strang, K. Development of concept-based physiology lessons for biomedical engineering undergraduate students. *Advances in Physiology Education*. 2013.

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

1. Campus Diversity Liaison, University of Wisconsin - Madison
2. Faculty Director, Campus Women Faculty Mentoring Program, University of Wisconsin - Madison
3. Co-Chair, Big 10 Women's Workshop
4. Member, Denice D. Denton Emerging Leader Award Committee
5. Member, Denice D. Denton Workshop Organizing Committee

NSF BIOGRAPHICAL SKETCH

NAME: Downing, Timothy

POSITION TITLE & INSTITUTION: Assistant Professor, Department of Biomedical Engineering, University of California, Irvine

(a) PROFESSIONAL PREPARATION

INSTITUTION	LOCATION	MAJOR / AREA OF STUDY	DEGREE (if applicable)	YEAR YYYY
Northwestern University	Evanston, Illinois	Chemical Engineering	BS	2008
University of California, Berkeley	Berkeley, California	Bioengineering	PHD	2013
University of California, San Francisco	San Francisco, California	Bioengineering	PHD	2013
Harvard University	Cambridge, Massachusetts	Postdoctoral Fellow - Stem Cell and Regenerative Biology	OTH	2015
The Broad Institute of MIT and Harvard	Cambridge, Massachusetts	Postdoctoral Fellow - Epigenomics	OTH	2015

(b) APPOINTMENTS

- 2016 - present Assistant Professor, Department of Biomedical Engineering, University of California, Irvine
- 2018 - present Member, Edwards Lifesciences Center for Advanced Cardiovascular Technology, University of California, Irvine
- 2018 - present Assistant Professor (by courtesy), Department of Microbiology & Molecular Genetics, University of California, Irvine
- 2016 - present Member, Institutional Biosafety Committee (IBC), University of California, Irvine
- 2016 - present Member, Sue and Bill Gross Stem Cell Research Center, University of California, Irvine
- 2014 - 2015 Postdoctoral Fellow, The Broad Institute of MIT and Harvard
- 2014 - 2015 Postdoctoral Fellow, Harvard University
- 2010 - 2010 Visiting Scientist, Center for iPS Cell Research and Application (CiRA), Kyoto University

(c) PRODUCTS

Products Most Closely Related to the Proposed Project

1. Busto-Moner L, Morival J, Ren H, Fahim A, Reitz Z, Downing TL, Read EL. Stochastic modeling reveals kinetic heterogeneity in post-replication DNA methylation. PLoS Comput Biol. 2020 Apr;16(4):e1007195. PubMed Central PMCID: [PMC7176288](https://pubmed.ncbi.nlm.nih.gov/32111111/).
2. Charlton J, Downing TL, Smith ZD, Gu H, Clement K, Pop R, Akopian V, Klages S, Santos DP, Tsankov AM, Timmermann B, Ziller MJ, Kiskinis E, Gnirke A, Meissner A. Global delay in nascent strand DNA methylation. Nat Struct Mol Biol. 2018 Apr;25(4):327-332. PubMed Central PMCID: [PMC5889353](https://pubmed.ncbi.nlm.nih.gov/31411111/).

3. Downing TL, Soto J, Morez C, Houssin T, Fritz A, Yuan F, Chu J, Patel S, Schaffer DV, Li S. Biophysical regulation of epigenetic state and cell reprogramming. *Nat Mater.* 2013 Dec;12(12):1154-62. PubMed PMID: [24141451](#).
4. Meli VS, Veerasubramanian PK, Atcha H, Reitz Z, Downing TL, Liu WF. Biophysical regulation of macrophages in health and disease. *J Leukoc Biol.* 2019 Aug;106(2):283-299. PubMed Central PMCID: [PMC7001617](#).
5. Downing TL, Wang A, Yan ZQ, Nout Y, Lee AL, Beattie MS, Bresnahan JC, Farmer DL, Li S. Drug-eluting microfibrinous patches for the local delivery of rolipram in spinal cord repair. *J Control Release.* 2012 Aug 10;161(3):910-7. PubMed Central PMCID: [PMC3698241](#).

Other Significant Products, Whether or Not Related to the Proposed Project

(d) SYNERGISTIC ACTIVITIES

1. Awards: Rising Star Junior Faculty Award, BMES-Cell and Molecular Bioengineering (CMBE), 2020; National Institutes of Health (NIH) Director's New Innovator Award, 2019; Forbes Magazine 30 Under 30 in Science, 2017; Dean's Postdoctoral Fellowship, Harvard University, 2015; Postdoctoral Fellowship, Ford Foundation, 2014; Postdoctoral Fellowship, UNCF/Merck, 2014; Postdoctoral Fellowship, Broad Institute of MIT and Harvard, 2014; Outstanding Graduate Student Instructor Award, University of California, Berkeley, 2013; Siebel Scholar Award, 2012.
2. Courses developed and taught by PI: BME160 – Tissue Engineering, 2016-present; BME 295 – Engineering Human Potential, 2018-present; BME 114 – Genetic Engineering and Synthetic Biology, 2019-present.
3. Affiliations: Member, Center for Multiscale Cell Fate (CMCF), 2018-present; Member, Center for Epigenetics and Metabolism (CEM), 2017-present; Member, Sue and Bill Gross Stem Cell Research Center (SCRC), 2016-present; Core Faculty Member, Edwards Lifesciences Center for Advanced Cardiovascular Technology (ELCACT), 2018-present.
4. Graduate and Postdoc education and training: Co-Organizer, MechBio Conference: The Mechanome in Action, 2018; Guest Lecturer and Team Mentor, Center for Complex Biological Systems (CCBS) Short Course in Systems Biology: A Foundation for Interdisciplinary Careers, 2017-present.
5. Undergraduate research education and training: Guest Speaker and UCI Undergraduate Research Mentor, Minority Science Program (MSP) and Minority Access to Research Careers Program, 2018-2019; Guest Speaker and Hampton University Undergraduate Research Mentor, Pathways to Biophotonics and Biomedical Engineering (PBBE) program, summer 2018; UCI Undergraduate Research Mentor, Undergraduate Research Opportunity Program (SROP), 2016-present; UCI Undergraduate Research Mentor, UC Leadership Excellence through Advanced Degrees (UC LEADS), 2017-2019.

NAME: Guo, X. Edward

POSITION TITLE & INSTITUTION: Stanley Dicker Professor of Biomed. Engineering, Columbia University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Peking University	Beijing, China	Applied Mechanics	B.S.	1994
Harvard University	Cambridge, MA	Engineering Science	M.S.	1990
Harvard University	Cambridge, MA	Medical Engineering and Medical Physics	Ph.Dd	1994

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2018 - Present	Stanley Dicker Professor of Biomedical Engineering, Columbia University, New York, NY
2017 - Present	Chair, Department of Biomedical Engineering, Columbia University, New York, NY
2014 - 2017	Vice Chair, Department of Biomedical Engineering, Columbia University, New York, NY
2007 - Present	Professor of Biomedical Engineering, Department of Biomedical Engineering, Columbia University, New York, NY
2004 - 2007	Associate Professor of Dental and Craniofacial Bioengineering (in Dentistry), College of Dental Medicine, Columbia University, New York, NY
2001 - 2007	Associate Professor of Biomedical Engineering, (with tenure 2003) Department of Biomedical Engineering, Columbia University, New York, NY
1998 - 2001	Assistant Professor of Biomedical Engineering, Department of Biomedical Engineering, Columbia University, 1New York, NY
1996 - 1998	Assistant Professor of Mechanical Engineering, Department of Mechanical Engineering, Columbia University, New York, NY
1993 - 1996	Postdoctoral Research Fellow, Orthopaedic Research Laboratories, University of Michigan, Ann Arbor, MI

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Takai, E., Mauck, R. L., Hung, C. T. and Guo, X. E. (2004) Osteocyte Viability and Regulation of Osteoblast Function in a 3D Trabecular Bone Explant under Dynamic Hydrostatic Pressure, *Journal of Bone and Mineral Research*, 19(9):1403-1410.
2. Lu, X. L., Huo B., Chiang, V. C., Baik, A. D., and Guo, X. E. (2012) Osteocytic Network Is More Responsive in Calcium Signaling than Osteoblastic Network under Fluid Flow, *Journal of Bone and Mineral Research*, 27(3): 563-574.
3. Baik, A. D., Lu, X. L., Qiu, J., Huo, B., Hillman, E. M.C., Dong, C., and Guo, X. E. (2010) Quasi-3D Cytoskeletal Dynamics of Osteocytes under Fluid Flow, *Biophysical Journal*, 99(9): 2812-2820.
4. Jing, D., Baik, A. D., Lu, X. L., Zhou, B., Lai, X., Wang, L. Luo, E., and Guo, X. E. (2014) In Situ Intracellular Calcium Oscillations in Osteocytes in Intact Mouse Long Bones under Dynamic Mechanical Loading, *FASEB Journal*, 28(4):1582-1592.
5. Morrell, A. E., Brown, G. N., Robinson, S. T., Sattler, R. L., Baik, A. D., Zhen, G., Cao, X, Bonewald, L. F., Jin, W., Kam, L. C., and Guo, X. E. (2018) Mechanically induced Ca²⁺ oscillations in osteocytes release extracellular vesicles and enhance bone formation, *Bone Research*, 6:6.

Other Significant Products, Whether or Not Related to the Proposed Project

1. Chan, M. E., Lu. X. L., Huo, B., Baik, A. D., Chiang, V., Guldberg, R. E., Lu, H. H., and Guo, X. E. (2009) A Trabecular Bone Explant Model of Osteocyte-Osteoblast Co-Culture for Bone Mechanobiology, *Cellular and Molecular Bioengineering*, 2(3): 405-415.
2. Lu, X. L., Huo, B. Park, M., and Guo, X. E. (2012) Calcium Responses in Osteocytic Network under Steady and Oscillatory Flow, *Bone*, 51(3):466-473.
3. Jing, D., Lu, X. L., Leong, P. L., Sajda, P., and Guo, X. E. (2013) Spatiotemporal Properties of Intracellular Calcium [Ca²⁺]_i Signaling in Osteocytic and Osteoblastic Cell Networks under Fluid Flow, *Bone*, 53(2):531-540.
4. Baik, A. D., Qiu, J., Hillman, E. M.-C., Dong, C., and Guo, X. E. (2013) Simultaneous Tracking of 3D Actin and Microtubule Strains in Individual MLO-Y4 Osteocytes under Oscillatory Flow, *Biochem Biophys Res Commun.*, 4

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f\(i\)\(d\)](#))

- Founding Editor-in-Chief of Biomedical Engineering Society (BMES) Cellular and Molecular Bioengineering 2008-2012
- President, The Society for Physical Regulation in Biology and Medicine 2012
- Founding Chair of Cellular and Molecular Bioengineering SIG at BMES
- President, International Chinese Musculoskeletal Society 2011-2013
- Chaired the NSF Inaugural International Workshop on Multiscale Mechanobiology, Hong Kong 2014

NAME: Johanna Hannan

POSITION TITLE & INSTITUTION: Assistant Professor, East Carolina University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Queen's University	Kingston, ON	Life Sciences/Pharmacology	BScH	2003
Queen's University	Kingston, ON	Pharmacology & Toxicology	PhD	2009
Augusta University	Augusta, GA	Physiology/Smooth muscle		2009-2011
Johns Hopkins University	Baltimore, MD	Benign Urology		2011-2015

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2015-present	Assistant Professor, Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

Powers SA, Burseson LK, Hannan JL. Managing female pelvic floor disorders: a medical device review and appraisal. *Interface Focus*. 2019 Aug 6;9(4):20190014.

Ahmed H, Hannan JL, Apolzan JW, Osikoya O, Cushen SC, Romero SA, Goulopoulou S. A free-choice high-fat, high-sucrose diet induces hyperphagia, obesity, and cardiovascular dysfunction in female cycling and pregnant rats. *Am J Physiol Regul Integr Comp Physiol*. 2019 May 1;316(5):R472-R485.

Castiglione F, Bergamini A, Albersen M, Hannan JL, Bivalacqua TJ, Bettiga A, Benigni F, Salonia A, Montorsi F, Hedlund P. Pelvic nerve injury negatively impacts female genital blood flow and induces vaginal fibrosis-implications for human nerve-sparing radical hysterectomy. *BJOG*. 2015 Oct;122(11):1457-65.

Goulopoulou S, Hannan JL, Matsumoto T, Ergul A, Webb RC. Augmented dilation to nitric oxide in uterine arteries from rats with type 2 diabetes: implications for vascular adaptations to pregnancy. *Am J Physiol Heart Circ Physiol*. 2014 Feb 15;306(4):H610-8.

Hannan JL, Cheung GL, Blaser MC, Pang JJ, Pang SC, Webb RC, Adams MA. Characterization of the vasculature supplying the genital tissues in female rats. *J Sex Med*. 2012 Jan;9(1):136-47.

Other Significant Products, Whether or Not Related to the Proposed Project

Powers SA, Ryan TE, Pak ES, Fraser MO, McClung JM, Hannan JL. Chronic high-fat diet decreased detrusor mitochondrial respiration and increased nerve-mediated contractions. *Neurourol Urodyn*. 2019 Aug;38(6):1524-32.

Hannan JL, Powers SA, Wang VM, Castiglione F, Hedlund P, Bivalacqua TJ. Impaired contraction and decreased detrusor innervation in a female rat model of pelvic neuropraxia. *Int Urogynecol J*. 2017 Jul;28(7):1049-1056.

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

Director, Brody School of Medicine Research Distinction Track Emphasizes leadership, experiential learning and mentored project completion for medical students.	2020-present
Chair, Research Grant for International Society for the Study of Women's Sexual Health	2018-present
Founding Member, Eastern North Carolina Chapter of Graduate Women in Science (GWIS)	2016

NAME: Christine P. Hendon

POSITION TITLE & INSTITUTION: Associate Professor, Columbia University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Massachusetts Institute of Technology	Cambridge, MA	Electrical Engineering and Computer Science	B.S.	2004
Case Western Reserve University	Cleveland, OH	Biomedical Engineering	Ph.D.	2010
Harvard Medical School	Boston, MA	Biomedical Optics	Postdoc	2012

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2018 - Present	Associate Professor, Columbia University, New York, NY
2012 - 2017	Assistant Professor, Columbia University, New York, NY

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. James P. McLean, Shuyang Fang, George Gallos, Kristin M. Myers, and Christine P. Hendon. Three-dimensional collagen fiber mapping and tractography of human uterine tissue using OCT. *Biomedical Optics Express*. 11(9). (2020)
2. Yu Gan, Theresa H. Lye, Charles C. Marboe, Christine P. Hendon. Characterization of the human myocardium by optical coherence tomography. *Journal of biophotonics*, e201900094 (2019)
3. James McLean, Yu Gan, Theresa H Lye, Dovina Qu, Helen Lu, and Christine P Hendon. High-speed collagen fiber modeling and orientation quantification for optical coherence tomography imaging. *Optics Express* 27(10), 14457-14471. (2019)
4. Wang Yao **, Yu Gan **, Kristin Myers, Joy Vink, Ronald Wapner, and Christine P. Hendon. Collagen Fiber Orientation and Dispersion of the Upper Cervix. *PLOS One*. 11(11): e0166709. (2016) ** denotes equal contribution.
5. Xinwen Yao, Yu Gan, Yuye Ling, Charles C. Marboe and Christine P. Hendon. Multi-contrast Endomyocardial Imaging By Single-channel High Resolution Cross-polarization Optical Coherence Tomography. *Journal of Biophotonics*. 11(4), p e201700204. (2018)

Other Significant Products, Whether or Not Related to the Proposed Project

- 1.. Xingchen Ji**, Xinwen Yao**, Yu Gan, Aseema Mohanty, Mohammad A. Tadayon, Christine P. Hendon, and Michal Lipson. On-chip tunable photonic delay line. *APL Photonics*. 4 pp 090803. (2019)
2. Rajinder P. Singh-Moon, Soo Young Park, Diego M. Song Cho, Agastya Vaidya, Charles C. Marboe, Elaine Y. Wan, and Christine P. Hendon. Feasibility of near-infrared spectroscopy as a tool for anatomical mapping of the human epicardium. *Biomedical Optics Express*. 11(8) pp 4099-4109 (2020)
3. Theresa H. Lye, Charles C. Marboe and Christine P. Hendon. Imaging of Sub-Endocardial Adipose Tissue and Fiber Orientation Distributions in the Human Left Atrium using Optical Coherence Tomography. *Journal of Cardiac Electrophysiology*. 30 (12), 2950-2959 (2019)

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

1. Optical Society Volunteering: Board of Meetings, Conference Program Chair, Conference Program Co-Chair
2. SPIE Photonics West. Conference Committee and Program Committee
3. Reviewer for NIH CMT (Cellular and Molecular Technologies) study section, MIT Technology Review
4. PhD Admissions and Recruitment Committee Member and Chair (EngAGE)
5. Outreach including Lab Tours, Demonstrations, Panel Discussions, Hk Maker Lab

NSF BIOGRAPHICAL SKETCH

NAME: Kam, Lance

POSITION TITLE & INSTITUTION: Professor of Biomedical Engineering and Medical Sciences (in Medicine), Columbia University

(a) PROFESSIONAL PREPARATION

INSTITUTION	LOCATION	MAJOR / AREA OF STUDY	DEGREE (if applicable)	YEAR YYYY
Washington University	St. Louis, MO	Physics	BS	1991
Washington University	St. Louis, MO	Mechanical Engineering	BS	1991
University of Hawaii	Manoa, HI	Mechanical Engineering	MS	1994
Rensselaer Polytechnic Institute	Troy, NY	Biomedical Engineering	PHD	1999
Stanford University	Stanford, CA		Postdoctoral Fellow	2000 - 2003

(b) APPOINTMENTS

- 2018 - present Professor of Biomedical Engineering and Medical Sciences (in Medicine), Columbia University, New York, NY
- 2012 - 2018 Associate Professor of Biomedical Engineering, Columbia University, New York, NY
- 2003 - 2012 Assistant Professor of Biomedical Engineering, Columbia University, New York, NY

(c) PRODUCTS

Products Most Closely Related to the Proposed Project

1. Bashour KT, Gondarenko A, Chen H, Shen K, Liu X, Huse M, Hone JC, Kam LC. CD28 and CD3 have complementary roles in T-cell traction forces. Proc Natl Acad Sci U S A. 2014 Feb 11;111(6):2241-6. PubMed Central PMCID: [PMC3926067](https://pubmed.ncbi.nlm.nih.gov/26067067/).
2. Lee JH, Shao S, Kim M, Fernandes SM, Brown JR, Kam LC. Multi-factor clustering incorporating cell motility predicts T cell expansion potential. Frontiers in cell and developmental biology. Forthcoming.
3. Jin W, Tamzalit F, Chaudhuri PK, Black CT, Huse M, Kam LC. T cell activation and immune synapse organization respond to the microscale mechanics of structured surfaces. Proc Natl Acad Sci U S A. 2019 Oct 1;116(40):19835-19840. PubMed Central PMCID: [PMC6778209](https://pubmed.ncbi.nlm.nih.gov/36778209/).
4. Nataraj NM, Dang AP, Kam LC, Lee JH. Ex vivo induction of regulatory T cells from conventional CD4⁺ T cells is sensitive to substrate rigidity. J Biomed Mater Res A. 2018 Dec;106(12):3001-3008. PubMed Central PMCID: [PMC6240380](https://pubmed.ncbi.nlm.nih.gov/3240380/).
5. Dang A, De Leo S, Bogdanowicz DR, Yuan DJ, Fernandes SM, Brown JR, Lu HH, Kam LC. Enhanced activation and expansion of T cells using mechanically soft elastomer fibers. Adv Biosyst. 2018 Feb;2(2) PubMed Central PMCID: [PMC6469863](https://pubmed.ncbi.nlm.nih.gov/36469863/).

Other Significant Products, Whether or Not Related to the Proposed Project

1. Lee JH, Dustin ML, Kam LC. A microfluidic platform reveals differential response of regulatory T cells to micropatterned costimulation arrays. *Integr Biol (Camb)*. 2015 Nov;7(11):1442-53. PubMed Central PMCID: [PMC4630128](#).
2. Bashour KT, Tsai J, Shen K, Lee JH, Sun E, Milone MC, Dustin ML, Kam LC. Cross talk between CD3 and CD28 is spatially modulated by protein lateral mobility. *Mol Cell Biol*. 2014 Mar;34(6):955-64. PubMed Central PMCID: [PMC3958039](#).
3. Tsai J, Kam L. Rigidity-dependent cross talk between integrin and cadherin signaling. *Biophys J*. 2009 Mar 18;96(6):L39-41. PubMed Central PMCID: [PMC2717266](#).
4. Shen K, Thomas VK, Dustin ML, Kam LC. Micropatterning of costimulatory ligands enhances CD4+ T cell function. *Proc Natl Acad Sci U S A*. 2008 Jun 3;105(22):7791-6. PubMed Central PMCID: [PMC2409411](#).
5. Tamzalit F, Wang MS, Jin W, Tello-Lafoz M, Boyko V, Heddleston JM, Black CT, Kam LC, Huse M. Interfacial actin protrusions mechanically enhance killing by cytotoxic T cells. *Sci Immunol*. 2019 Mar 22;4(33) PubMed Central PMCID: [PMC6746172](#).

(d) SYNERGISTIC ACTIVITIES

1. Columbia University School of Engineering: Instructor of courses hosted through the Columbia Video Network (ranked #1 online graduate program, US News & World report, multiple years), Dean's Task Force on Online Education.
2. Department of Biomedical Engineering: Chair of Committee on Undergraduate Curriculum.
3. Review panels for US agencies: NIH and NSF.
4. Professional societies: Biomedical Engineering Society and Society for Biomaterials (SFB). SFB Special Interest Group on Immune Engineering.
5. School Leadership Team, PS334; The Anderson School is a public K-8 school in New York City.

NSF BIOGRAPHICAL SKETCH

NAME: Kim, Sunghan

POSITION TITLE & INSTITUTION: Associate Professor, East Carolina University

(a) PROFESSIONAL PREPARATION

INSTITUTION	LOCATION	MAJOR / AREA OF STUDY	DEGREE (if applicable)	YEAR YYYY
Korea University	Seongbuk, Seoul	Electrical Engineering	AS	2000
Portland State University	Portland, OR	Electrical Engineering	BS	2003
Portland State University	Portland, OR	Electrical Engineering	MS	2005
Portland State University	Portland, OR	Biomedical Engineering	PHD	2009
UCLA Neurosurgery	Los Angeles, CA		Postdoctoral Fellow	2009 - 2012

(b) APPOINTMENTS

- 2019 - present Associate Professor, East Carolina University, College of Engineering and Technology, Greenville, NC
- 2019 - present Graduate Program Director, East Carolina University, College of Engineering and Technology, Greenville, NC
- 2012 - 2019 Assistant Professor, East Carolina University, College of Engineering and Technology, Greenville, NC
- 2009 - 2012 Post-doctoral Fellow, UCLA, Neurosurgery, Los Angeles, CA
- 2007 - 2009 Adjunct Faculty, Portland State University, Maseeh College of Engineering and Computer Science, Portland, OR

(c) PRODUCTS

Products Most Closely Related to the Proposed Project

1. Kim S, Noor F, Aboy M, McNames J. A novel particle filtering method for estimation of pulse pressure variation during spontaneous breathing. Biomed Eng Online. 2016 Aug 11;15(1):94. PubMed Central PMCID: [PMC4982304](https://pubmed.ncbi.nlm.nih.gov/26510301/).
2. Kim S, Scalzo F, Telesca D, Hu X. Ensemble of sparse classifiers for high-dimensional biological data. Int J Data Min Bioinform. 2015;12(2):167-83. PubMed PMID: [26510301](https://pubmed.ncbi.nlm.nih.gov/26510301/).

Other Significant Products, Whether or Not Related to the Proposed Project

(d) SYNERGISTIC ACTIVITIES

1. Dr. Sunghan Kim is an academic collaborator of RFPi Inc., named for Real-time Flow and Perfusion Imaging, which is a Greenville, North Carolina-based medical device company committed to the development and commercialization of innovative and transformational platform technologies for non-invasive surgical imaging. RFPi's FDA-cleared iCertainty device and the underlying Multi-Spectral Physiologic Visualization ("MSPV") technology platform enable surgeons to see real-time images of blood flow distribution and tissue perfusion without patient contact. RFPi's patented and copyrighted iCertainty platform captures this critical data without dye injections, ionizing radiation, direct patient contact, or risk to patients or providers while imaging as often as needed to assess blood flow distribution in the procedure. This new knowledge and its documentation survive the procedure using the RFPi-ARMUS Cloud Repository and Surgeon Web

Portal for further analysis of the procedural data and imaging. Dr. Kim has been collaborating with RFPi team to implement and verify the MSPV technology.

2. In collaboration with ECU Nursing Dr. Sunghan Kim focuses on examining brainwaves recorded from geriatric populations in order to identify electrophysiological biomarkers that can be used to diagnose mild cognitive impairment and Alzheimer's disease as early as possible. Dr. Kim's research team has screened over thirty geriatric citizens with and without mild cognitive impairment and demonstrated that it is possible to identify those with mild cognitive impairment by adopting advanced machine learning methods. Two Brody school of medicine nurses were fully funded by a \$2.5 million HRSA grant (PI: Sonya Hardin) and have been tremendously helpful for our team to carry on this project. We have presented our work at various international conferences and meetings such as IEEE EMBS. Two master theses have been published and several journal manuscripts are under preparation.

NSF BIOGRAPHICAL SKETCH

NAME: King, Christine

POSITION TITLE & INSTITUTION: Assistant Professor of Teaching, University of California Irvine

(a) PROFESSIONAL PREPARATION

INSTITUTION	LOCATION	MAJOR / AREA OF STUDY	DEGREE (if applicable)	YEAR YYYY
Manhattan College	Bronx, NY	Mechanical Engineering	BS	2008
Manhattan College	Bronx, NY	Mechanical Engineering	MS	2009
UCI	Irvine, CA	Biomedical Engineering	MS	2010
UCI	Irvine, CA	Biomedical Engineering	PHD	2014
UCLA	Los Angeles, CA	Neurology, Postdoctoral	OTH	2016

(b) APPOINTMENTS

- 2018 - present Assistant Professor of Teaching, University of California Irvine, Department of Biomedical Engineering, Irvine, CA
- 2016 - 2018 Project Scientist and Research Manager, University of California Los Angeles, Department of Computer Science, Los Angeles, CA
- 2014 - 2016 Postdoctoral Scholar, University of California Los Angeles, Neurology Department, Los Angeles, CA
- 2012 - 2012 Intern, HRL Laboratories, LLC, Information Systems Sciences Laboratory, Malibu, CA
- 2009 - 2009 Intern, Lucius Pitkin Inc., R&D Department, New York, NY
- 2007 - 2008 HVAC Engineer, Ryan Consulting Engineers, New York, NY
- 2007 - 2007 Intern, Royal National Orthopaedics Hospital, ASPIRE Centre of Orthopaedics, Stanmore

(c) PRODUCTS

Products Most Closely Related to the Proposed Project

1. King C. Assessing Effectiveness of a Ground Rule System for Group Work in Large Engineering Courses. ; peer.asee.org; c2019. Available from: <https://peer.asee.org/assessing-effectiveness-of-a-ground-rule-system-for-group-work-in-large-engineering-courses>
2. King C, Hoo C, Tang W, Khine M. Introducing Entrepreneurship Into A Biomedical Engineering Capstone Course At The University of California, Irvine. Technology & Innovation. 2019; 20(3):179-195.
3. Salinas E, Williams A, King C. Effect of controlling group heterogeneity on student performance in a graphical programming course. ; Google Scholar; c2019.
4. King C, Trevino C, Biswas P. Online Laboratory Experiment Learning Module for Biomedical Engineering Physiological Laboratory Courses. Biomedical Engineering Education. 2020; :1-8.
5. King C. Introducing Neuroscience to High School Students through Low-Cost Brain Computer Interface Technologies.

Other Significant Products, Whether or Not Related to the Proposed Project

1. King C, Sarrafzadeh M. A survey of smartwatches in remote health monitoring. Journal of healthcare informatics research. 2018; 2(1-2):1-24.
2. Wang PT, King CE, McCrimmon CM, Lin JJ, Sazgar M, Hsu FP, Shaw SJ, Millet DE, Chui LA, Liu CY, Do AH, Nenadic Z. Comparison of decoding resolution of standard and high-density electrocorticogram electrodes. J Neural Eng. 2016 Apr;13(2):026016. PubMed PMID: [26859341](#); PubMed Central PMCID: [PMC6508958](#).
3. King C, Wang P, McCrimmon C, Chou C, Do A, Nenadic Z. The feasibility of a brain-computer interface functional electrical stimulation system for the restoration of overground walking after paraplegia. Journal of neuroengineering and rehabilitation. 2015; 12(1):1-11.
4. McCrimmon CM, King CE, Wang PT, Cramer SC, Nenadic Z, Do AH. Brain-controlled functional electrical stimulation therapy for gait rehabilitation after stroke: a safety study. J Neuroeng Rehabil. 2015 Jul 11;12:57. PubMed PMID: [26162751](#); PubMed Central PMCID: [PMC4498504](#).
5. Dorsch A, King C, Dobkin B. Neurorehabilitation Technology. Google Scholar; 2016///. Wearable Wireless Sensors for Rehabilitation605-615p.

(d) SYNERGISTIC ACTIVITIES

1. Virtual Reality Unmet Clinical Needs Finding: The Department of Biomedical Engineering and School of Medicine at the University of California Irvine are developing a virtual reality environment repository for students to be able to perform unmet clinical needs finding. As PI of the project, I am in charge of overseeing the repository development, development of the learning modules and course materials, as well as the instructor of the course.
2. Active Learning and Entrepreneurship in Biomedical Engineering Design Courses: As instructor of the BioENGINE program and lead researcher of projects, I have overseen over 450 students in both their lower division and upper division courses on various biomedical engineering projects, start up companies, and prototypes.
3. Real-Time Assessment of Pediatric Asthma Risk: The LA PRISMS Center develops mobile health technologies for the self-management of pediatric asthma. As project scientist and research manager, I managed a large collaborative effort that focused on the creation of an end-to-end infrastructure for pediatric sensor-based health monitoring.
4. Using Wireless Health Devices to Monitor Interventions and Behavior in the Community: At the UCLA Wireless Health Institute, I worked with a team of engineers, computer scientist, and physicians to develop wireless health devices that monitor walking and upper extremity movements of stroke individuals in the community.
5. Developing Neurorehabilitation Interventions for Stroke and Spinal Cord Injury: I developed several novel neurorehabilitative intervention strategies to restore movement in stroke and spinal cord injury individuals through the use of brain-computer interface systems.

NAME: Katrina M. Knight

POSITION TITLE & INSTITUTION: Postdoctoral Associate, University of Pittsburgh

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Clafin University	Orangeburg, SC	Biochemistry	BS	2009
University of Pittsburgh	Pittsburgh, PA	Bioengineering	PhD	2017
Department of Medicine University of Pittsburgh	Pittsburgh, PA	Clinical Translational Science	Postdoctoral training	2017 - 2019
Department of Obstetrics, Gynecology & Reproductive Sciences	Pittsburgh, PA	Urogynecology	Postdoctoral training	2019 - Present

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2019 - Present	Postdoctoral Associate, Department of Obstetrics, Gynecology & Reproductive Sciences, University of Pittsburgh, Pittsburgh, PA
2017 - 2019	Postdoctoral Scholar, Department of Medicine, University of Pittsburgh, Pittsburgh, PA
2010 - 2017	Graduate Research Assistant, Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA
2009 - 2010	Laboratory Coordinator, Department of Biology, Clafin University, Orangeburg, SC

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

Publications

- 1) Knight K.M., Moalli P.A., Nolfi A., Palcsey S., Barone W.R., Abramowitch S.D. Impact of Parity on Ewe Vaginal Mechanical Properties Relative to the Nonhuman Primate and Rodent. *International Urogynecology Journal and Pelvic Floor Dysfunction* 2016;27(8):1255-1263
- 2) Liang R., Knight K., Easley D., Palcsey S., Abramowitch S., Moalli P.A. Towards Rebuilding Vaginal Support Utilizing an Extracellular Matrix Bioscaffold. *Acta Biomaterialia* 2017;57:324-333
- 3) Liang R., Knight K., Barone W., Powers R.W., Nolfi A., Palcsey S., Abramowitch S., Moalli P.A. Extracellular Matrix Regenerative Graft Attenuates the Negative Impact of Polypropylene Prolapse Mesh on Vagina in Rhesus Macaque. *American Journal of Obstetrics and Gynecology* 2017;216(2):153.e1-153.e9
- 4) Knight KM., Moalli PA., Abramowitch SD. Preventing Mesh Pore Collapse by Designing Mesh Pores with Auxetic Geometries: A Comprehensive Evaluation via Computational Modeling. *Journal of Biomechanical Engineering* 2018;140(5):0510051-0510058
- 5) Knight KM., Artsen AM., Routzong MR., King GE., Abramowitch SD., Moalli PA. New Zealand White Rabbit: A Novel Model for Prolapse Mesh Implantation via a Lumbar Colpopexy. *International Urogynecology Journal* 2020;31:91-99

Other Significant Products, Whether or Not Related to the Proposed Project

Publications

- 1) Liang R., Abramowitch S., Knight K., et al. Vaginal Degeneration Following Implantation of Synthetic Mesh with Increased Stiffness. *British Journal of Obstetrics and Gynaecology* 2013;120(2):233-243
- 2) Liang R., Knight K., Nolfi A., Abramowitch S., Moalli P.A. Differential Effects of Selective Estrogen Receptor Modulators on the Vagina and Its Supportive Tissues. *Menopause* 2016;23(2):129-137
- 3) Barone WR., Knight KM., Moalli PA., Abramowitch SD. Deformation of Transvaginal Mesh in Response to Multiaxial Loading. *Journal of Biomechanical Engineering* 2019;141(2):0210011-0210018
- 4) Shapiro KK, Knight KM, Liang R, et al. Comparison of Two Single Incision Slings on the Vagina in an Ovine Model. *American Journal of Obstetrics and Gynecology* 2021;224(1):78.e1-78.e7

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

- 1) Organizer and Co-Presenter. "From 2D to 3D: Exploring the Ins and Outs of Female Pelvic Anatomy". Magee-Womens Research 9-90 Summit, 2018. Pittsburgh, PA. Purpose: To increase the knowledge of middle to high school aged students of the female pelvic organs using 3D printed models.
- 2) I organized and led two STEM based workshops for high school students at Hillhouse Passport Academy Charter School in Pittsburgh, PA. The purpose of these workshops were to 1) introduce minority high school students to STEM careers and 2) to teach the students about the power of water and air by building water and air powered race cars.
- 3) I also serve as a peer-reviewer for the following journals: *American Journal of Obstetrics & Gynecology*, *Female Pelvic Medicine & Reconstructive Surgery*, and *Acta Biomaterialia*.

NAME: Spencer P. Lake

POSITION TITLE & INSTITUTION: Associate Professor, Washington University in St. Louis

A. PROFESSIONAL PREPARATION - (see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Utah	Salt Lake City, UT	Biomedical Engineering	B.S.	2003
University of Pennsylvania	Philadelphia, PA	Bioengineering	Ph.D.	2009
University of Minnesota	Minneapolis, MN	Biomedical Engineering	Post-doctoral	2009-2012

B. APPOINTMENTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2018 - Current	Associate Professor, Washington University in St. Louis, St. Louis, MO
2012 - 2018	Assistant Professor, Washington University in St. Louis, St. Louis, MO
2010 - 2012	Supervisor, Tissue Mechanics Lab, University of Minnesota, Minneapolis, MN

C. PRODUCTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#)) Products Most Closely Related to the Proposed Project

Castile RM, Cannon PC, Smith MV, Brophy RH, Lake SP: Donor age and sex have limited effects on the mechanical and microstructural properties of human connective tissues. *Journal of Orthopaedic Research*, In press.

Reiter AJ, Schott HR, Castile RM, Cannon PC, Havlioglu N, Chamberlain AM, Lake SP: Females and males exhibit similar functional, mechanical and morphological outcomes in a rat model of post-traumatic elbow contracture, *Journal of Orthopaedic Research*, 39(9), 2062-2072, 2021.

Hill JR, Eekhoff JD, Brophy RH, Lake SP: Elastic Fibers in orthopaedics: form and function in tendons and ligaments, clinical implications, and future directions. *Journal of Orthopaedic Research*, 38(11):2305-2317, 2020

Fang F, Lake SP: Modeling approaches for evaluating multiscale tendon mechanics. *Interface Focus*, 6:20150044, 2016. Invited paper.

Lake SP, Ray S, Zihni A, Thompson Jr. DM, Gluckstein J, Deeken CR: Pore size and pore shape – but not mesh density – alter the mechanical strength of tissue ingrowth into synthetic mesh materials in a porcine model of ventral hernia repair. *Journal of the Mechanical Behavior of Biomedical Materials*, 42:186-19

Other Significant Products, Whether or Not Related to the Proposed Project

Eekhoff JD, Steenbock H, Berke IM, Brinckmann J, Yanagisawa H, Wagenseil JE, Lake SP: Dysregulated assembly of elastic fibers in fibulin-5 knockout mice results in a tendon specific increase in elastic modulus. *Journal of Mechanical Behavior of Biomedical Materials*, 113, 104134, 2021.

Eekhoff JD, Lake SP: Three-dimensional computation of fiber orientation, diameter, and branching in segmented image stacks of fibrous networks, *Journal of Royal Society Interface*, 17(169):20200371, 2020.

Kahan LG, Brunt ML, Lake SP, Tan WH, McAllister J, Yu J, Thompson Jr. DM, Blatnik JA: Evaluating mechanical integration at the mesh-tissue interface in ventral hernia repair. *Surgical Endoscopy*, 32(2):820-830, 2018.

Deeken CR, Lake SP: Mechanical properties of the abdominal wall and biomaterials utilized for hernia repair. *Journal of Mechanical Behavior of Biomedical Materials*, 74:411-427, 2017.

Fang F, Lake SP: Multiscale mechanical integrity of human supraspinatus tendon in shear after elastin digestion. *Journal of Mechanical Behavior of Biomedical Materials*, 63:443-455, 2016.

D. SYNERGISTIC ACTIVITIES - (see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

Member of Executive Board, Member Affairs, Bioengineering Division, American Society of Mechanical Engineers (ASME), 2019 - current

Local Arrangements and Finance Chair, SB3C 2021 – Virtual Conference due to COVID-19. Virtual “Gather” space created for conference received multiple design awards: Vega Awards for Best Use of Interactivity (Canopus Winner), Science and Education (Centauri Winner), and Best Festival/Conference (Centauri Winner), and Untethered Award for Best Re-Tether Award.

BrightPath Young Black Scholars STEAM Program - hosted groups of visiting middle school students to introduce biomechanics research and participate in a hands-on workshop about multiscale force transfer, 2021 - current

National Science Foundation Grant Reviewer - member of 10 different grant review panels, 2013 - current

Associate Editor, *Journal of Biomechanical Engineering*, 2019 - current

NSF BIOGRAPHICAL SKETCH

NAME: Liu, Xiaowei

ORCID: 0000-0001-7247-2232

POSITION TITLE & INSTITUTION: Associate Professor, University of Pennsylvania

(a) PROFESSIONAL PREPARATION

INSTITUTION	LOCATION	MAJOR / AREA OF STUDY	DEGREE (if applicable)	YEAR YYYY
Tsinghua University	Beijing, Beijing	Biomedical Engineering	BENG	2002
Columbia University	New York, NY	Biomedical Engineering	PHD	2007
Columbia University Medical Center	New York, NY	Metabolic Bone Disease	Postdoctoral Fellow	2007 - 2009

(b) APPOINTMENTS

- 2018 - present Associate Professor, University of Pennsylvania, Department of Orthopaedic Surgery and Bioengineering, Philadelphia, PA
- 2012 - 2018 Assistant Professor, University of Pennsylvania, Department of Orthopaedic Surgery and Bioengineering, Philadelphia, PA
- 2009 - 2011 Associate Research Scientist, Columbia University Medical Center, Division of Endocrinology, New York, NY

(c) PRODUCTS

Products Most Closely Related to the Proposed Project

1. de Bakker CM, Altman-Singles AR, Li Y, Tseng WJ, Li C, Liu XS. Adaptations in the Microarchitecture and Load Distribution of Maternal Cortical and Trabecular Bone in Response to Multiple Reproductive Cycles in Rats. *J Bone Miner Res.* 2017 May;32(5):1014-1026. PubMed Central PMCID: [PMC5537002](#).
2. de Bakker CMJ, Zhao H, Tseng WJ, Li Y, Altman-Singles AR, Liu Y, Leavitt L, Liu XS. Effects of reproduction on sexual dimorphisms in rat bone mechanics. *J Biomech.* 2018 Aug 22;77:40-47. PubMed Central PMCID: [PMC6481170](#).
3. de Bakker CM, Li Y, Zhao H, Leavitt L, Tseng WJ, Lin T, Tong W, Qin L, Liu XS. Structural Adaptations in the Rat Tibia Bone Induced by Pregnancy and Lactation Confer Protective Effects Against Future Estrogen Deficiency. *J Bone Miner Res.* 2018 Dec;33(12):2165-2176. PubMed Central PMCID: [PMC6464108](#).
4. Li Y, Tseng WJ, de Bakker CMJ, Zhao H, Chung R, Liu XS. Peak trabecular bone microstructure predicts rate of estrogen-deficiency-induced bone loss in rats. *Bone.* 2021 Apr;145:115862. PubMed Central PMCID: [PMC7920939](#).
5. de Bakker CMJ, Tseng WJ, Li Y, Zhao H, Altman-Singles AR, Jeong Y, Robberts J, Han L, Kim DG, Sherry Liu X. Reproduction Differentially Affects Trabecular Bone Depending on Its Mechanical Versus Metabolic Role. *J Biomech Eng.* 2017 Nov 1;139(11) PubMed Central PMCID: [PMC5676645](#).

Other Significant Products, Whether or Not Related to the Proposed Project

1. Altman-Singles AR, Jeong Y, Tseng WJ, de Bakker CM, Zhao H, Lott C, Robberts J, Qin L, Han L, Kim DG, Liu XS. Intermittent Parathyroid Hormone After Prolonged Alendronate Treatment Induces Substantial New Bone Formation and Increases Bone Tissue Heterogeneity in Ovariectomized Rats. *J Bone Miner Res.* 2017 Aug;32(8):1703-1715. PubMed Central PMCID: [PMC5550334](#).
2. Altman AR, Tseng WJ, de Bakker CMJ, Chandra A, Lan S, Huh BK, Luo S, Leonard MB, Qin L, Liu XS. Quantification of skeletal growth, modeling, and remodeling by in vivo micro computed tomography. *Bone.* 2015 Dec;81:370-379. PubMed Central PMCID: [PMC4641023](#).
3. de Bakker CM, Altman AR, Tseng WJ, Tribble MB, Li C, Chandra A, Qin L, Liu XS. μ CT-based, in vivo dynamic bone histomorphometry allows 3D evaluation of the early responses of bone resorption and formation to PTH and alendronate combination therapy. *Bone.* 2015 Apr;73:198-207. PubMed Central PMCID: [PMC4336835](#).
4. Altman AR, de Bakker CM, Tseng WJ, Chandra A, Qin L, Liu XS. Enhanced individual trabecular repair and its mechanical implications in parathyroid hormone and alendronate treated rat tibial bone. *J Biomech Eng.* 2015 Jan;137(1) PubMed Central PMCID: [PMC5082207](#).
5. Altman AR, Tseng WJ, de Bakker CM, Huh BK, Chandra A, Qin L, Liu XS. A closer look at the immediate trabecula response to combined parathyroid hormone and alendronate treatment. *Bone.* 2014 Apr;61:149-57. PubMed Central PMCID: [PMC3972893](#).

(d) SYNERGISTIC ACTIVITIES

1. Reviewer: Ad hoc reviewers for more than 15 journals; Reviewers for national/international conferences (SB3C, ORS, ASBMR, World Congress on Biomechanics, ICOBR, etc); Reviewers for funding agencies (National Science Foundation; Technology Foundation STW; Arthritis Research UK; The National Aeronautics and Space Administration; Department of Defense).
2. Conference organization and session chair: Theme/session/workshop Chair/Co-Chair at national/international conferences (SB3C, ORS, World Congress on Biomechanics, International Conference on Osteoporosis and Bone Research) ; Session Chair/Co-Chair for more than 10 sessions at national conferences (SB3C, ORS, ASBMR, World Congress on Biomechanics, International Symposium on Computer Methods in Biomechanics and Biomedical Engineering).
3. Leadership/service at professional societies: Advisory Board, ORS Musculoskeletal Biology Workshop; Diversity, Equity, and Inclusion Committee, Orthopaedic Research Society; Co-Chair, The HubLE learning environment Thesis Report Committee, International Federation of Musculoskeletal Research Societies; Future Global Leaders Committee, International Federation of Musculoskeletal Research Societies; Diversity and Inclusion Task Force Committee, Orthopaedic Research Society; New Investigator Mentoring Committee, Orthopaedic Research Society
4. Outreach activities: 2013-present STEMPREP program to engage high school students from underrepresented groups in STEM field; 2015-2016 Nano Matters High School Workshops.
5. Education activities: Supervised 18 undergrad students, 8 MS students, and 9 Ph.D students since joined UPenn in 2012; 2016-present: course director “Musculoskeletal Biology and Bioengineering”; 2014-present: development of a seminar series “Orthopaedic Research Club” for junior faculty and trainees in the Philadelphia Area.

NAME:

POSITION TITLE & INSTITUTION:

A. PROFESSIONAL PREPARATION

(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)

B. APPOINTMENTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

Other Significant Products, Whether or Not Related to the Proposed Project

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

NAME: Lowder, Jerry Lane

POSITION TITLE & INSTITUTION: Associate Professor, Washington University in St. Louis

A. PROFESSIONAL PREPARATION - (see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of North Carolina	Chapel Hill, NC	Biology	BS	1995
East Carolina University - Brody SOM	Greenville, NC	Medicine	MD	1999
Pitt County Memorial Hospital	Greenville, NC	Obstetrics and Gynecology	Residency	2003
University of Pittsburgh Clinical Research Training Program	Pittsburgh, PA	Clinical Research Design	MSc	2005
University of Pittsburgh Medical Center - Magee-Women's Hospital	Pittsburgh, PA	Female Pelvic Medicine & Reconstructive Surgery	Fellowship	2006

B. APPOINTMENTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2020-Present	Co-Director, T32 Training program, Clinical Outcomes Research Training in Female Lower Urinary Tract Disorders, Washington University in St. Louis, MO
2018-Present	2018 - Present Food and Drug Administration Special Government Employee, Obstetrics and Gynecology Devices Panel, member
2014-Present	Associate Professor, Department of Obstetrics & Gynecology, Division of Female Pelvic Medicine and Reconstructive Surgery, Washington University in St. Louis
2014-Present	Division Director, Division of Female Pelvic Medicine and Reconstructive Surgery, Department of Obstetrics and Gynecology, Washington University in St. Louis
2015-Present	Assistant Fellowship Director, Female Pelvic Medicine & Reconstructive Surgery Fellowship, Department of Obstetrics and Gynecology, Washington University in St. Louis
2011-2014	Director of Urogynecology Outreach, Urogynecology Outreach Services, University of Pittsburgh
2006-2014	Assistant Fellowship Director, Female Pelvic Medicine & Reconstructive Surgery Fellowship, University of Pittsburgh
2006-2014	Assistant Professor, Department of Obstetrics, Gynecology & Reproductive Sciences, Division of Female Pelvic Medicine and Reconstructive Surgery, Pittsburgh, PA

C. PRODUCTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#)) Products Most Closely Related to the Proposed Project

1. Meister MR, Siobhan S, Lowder JL. Definitions of apical vaginal support loss: a systematic review. *Am J Obstet Gynecol.* 2017 Mar;216(3):232.e1-232.e14. PMID: 27640944.

***Chosen by the American Board of Obstetrics and Gynecology as a Female Pelvic Medicine & Reconstructive Surgery Maintenance of Certification (MOC) article 2017.

2. Lowder JL. Apical vaginal support: The often forgotten piece of the puzzle. (2017) *Mo Med* 114(3):171-175.

3. Ross WT, Meister MR, Shepherd JP, Olsen MA, Lowder JL. Utilization of apical vaginal support procedures at time of inpatient hysterectomy performed for benign conditions: a national estimate. *Am J Obstet Gynecol.* 2017

4. Carter-Brooks CM, Lowder JL, Du AL, Lavelle ES, Giugale LE, Shepherd JP. Restoring Genital Hiatus to Normative Values After Apical Suspension Alone Versus With Level 3 Support Procedures. *Female Pelvic Med Reconstr Surg.* 2017 Nov 29. [Epub ahead of print] PMID: 29210807

5. Putman JG, Meister MR, Lenger SM, Lowder JL. Regional Performance Of Apical Support Procedures At Time Of Hysterectomy For Benign Indications: What Is The Role Of Surgeon Training? *Female Pelvic Med Reconstr Surg.* 2020 Jul 1;27(7):421-426. PMID: 32701766.

Other Significant Products, Whether or Not Related to the Proposed Project

1. Lowder JL, Moon DK, Debes DM, Howden H, Abramowitch S, Woo S, Moalli P. Biomechanical Adaptations of the Rat Vagina and Supportive Tissues in Pregnancy to Accommodate Delivery. *Obstetrics & Gynecology*.109(1): 136-143. PMID: 17197599.
2. Lowder JL, Park A, Ellison R, Ghetti C, Moalli P, Zyczynski H, Weber AM. The role of apical vaginal support in the appearance of anterior and posterior vaginal prolapse. *Obstetrics & Gynecology*. 2008 111(1):152-157. PMID: 18165404.
3. Jones K, Yang L, Lowder JL, Meyn L, Moalli, P, Zyczynski H, Ellison R, Lee T. Impact of Pessary Use on Genital Hiatus Measurements With Pelvic Organ Prolapse. *Obstetrics & Gynecology*. 2008 112:630-636. PMID: 18757662.
4. Kantartzis K, Turner LC, Shepherd JP, Winger D, Wang L, Lowder JL. Apical support at the time of hysterectomy for uterovaginal prolapse. *Int Urogynecol J*. 2015 Feb;26(2):207-12. PMID: 25182150.
5. Lowder JL, Oliphant SS, Shepherd JP, Ghetti C, Sutkin G. Genital hiatus size is associated with and predictive of apical vaginal support loss. *Am J Obstet Gynecol* 2016 Jun;214(6):718.e1-8. Pii:S0002-9378(15)02575-2. [Epub ahead of print] ***Chosen by the American Board of Obstetrics and Gynecology as a General Gynecology Maintenance of Certification (MOC) article 2016.

D. SYNERGISTIC ACTIVITIES - (see [PAPPG Chapter II.C.2.f\(i\)\(d\)](#))

- Co-Investigator, Collaboration Initiation Grant in Women's Health Technologies Departments of Biomedical Engineering and Obstetrics and Gynecology, Developing a Prediction Model to Guide Surgical Decision Making in Female Pelvic Organ Prolapse Surgery Based on Anatomic Measurements (2021-2022)
- American Urogynecologic Society UrogynCREST Program Mentor (2019-Present)
- Co-Investigator, NIH/NICHD U01 HD077384, Optimizing Management of the 2nd Stage of Labor: A Multicenter Trial (2014-2021)
- Project lead, NIH/NIDDK P20DK119840, Molecular and neuro-inflammatory biology of aging bladder in normal and disease states (2018-2020)

NAME: Spandan Maiti

POSITION TITLE & INSTITUTION: Associate Professor, University of Pittsburgh

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Jadavpur University	Calcutta, India	Civil Engineering	B. C.E.	1992
Indian Institute of Science	Bangalore, India	Aerospace Engineering	M.S.	1997
University of Illinois at Urbana-Champaign	Urbana, IL	Aerospace Engineering	PhD	2002
University of Illinois at Urbana-Champaign	Urbana, IL	Aerospace Engineering	Post-doctoral	2002-2005

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2019-present	Associate Professor, Department of Bioengineering, University of Pittsburgh
2010-2019	Assistant Professor, Department of Bioengineering, University of Pittsburgh
2005-2010	Assistant Professor, Dept. of Mechanical Engineering-Engineering Mechanics, Michigan Technological University

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Fortunato RN, Robertson AM, Sang C, Maiti S; Effect of macro-calcification on the failure mechanics of intracranial aneurysmal wall tissue, *Experimental Mechanics*, 61(1):5-18, 2021.
2. J. A. McGuire, S. D. Abramowitch, S. Maiti and R. De Vita, "Swine vagina under planar biaxial loads: An investigation of large deformations and tears", *Journal of Biomechanical Engineering*, 141(4):041003, 2019.
3. J. R. Thunes, S. Pal, J. A. Phillippi, T. G. Gleason, D. A. Vorp, and S. Maiti, "Structural modeling reveals microstructure-strength relationship for human ascending thoracic aorta", *Journal of Biomechanics*, 71, 84-93, 2018.
4. W. R. Barone, R. Amini, S. Maiti, P. A. Moalli, and S. D. Abramowitch, "The impact of boundary conditions on surface curvature of polypropylene mesh in response to uniaxial loading", *Journal of Biomechanics*, 48(9):1566-1574, 2015.
5. A. Feola, S. Pal, P. A. Moalli, S. Maiti, and S. D. Abramowitch, "Varying degrees of nonlinear mechanical behavior arising from geometric differences of urogynecological meshes", *Journal of Biomechanics*, 47(11):2584-2589, 2014.

Other Significant Products, Whether or Not Related to the Proposed Project

1. S. Maiti, J. R. Thunes, R. N. Fortunato, T. G. Gleason, and D. A. Vorp, "Computational modeling of the strength of the ascending thoracic aortic media tissue under physiologic biaxial loading conditions", *Journal of Biomechanics*, 108:109884, 2020.
2. Fortunato RN, Robertson AM, Sang C, Maiti S; Computational modeling reveals the relationship between intrinsic failure properties and uniaxial biomechanical behavior of arterial tissue, *Biomech Model Mechanobiol*, 18(6):1791-1807, 2019.
3. C. Sang, S. Maiti, R. N. Fortunato, J. Kofler, and A. M. Robertson, "A uniaxial testing approach for consistent failure in vascular tissues", *Journal of Biomechanical Engineering*, 140(6): 061010, 2018.

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f\(i\)\(d\)](#))

1. I conducted weeklong Biomechanics Workshop at University of Santander, Colombia, and 3 day Biomechanics workshop at Indian Institute of Science, Bangalore, India, 2018.
2. I co-organized Computational and Mathematical Biomedical Engineering Conference in Pittsburgh, 2017.
3. I occasionally visit local high schools to discuss Bioengineering as a major and career as a bioengineer.

NAME: Joshua R. Mauney

POSITION TITLE & INSTITUTION: Associate Professor at the University of California, Irvine

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Tufts University	Medford, MA	Chemical Engineering	B.Sc.	1999
Tufts University	Medford, MA	Biotechnology Engineering	Ph.D.	2004
Tufts University	Medford, MA	Tissue Engineering	Postdoc	2006

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2019-Present	Tenured Associate Professor, Depts. of Urology and Biomedical Engineering, University of California, Irvine
2019-Present	Jerry D. Choate Presidential Chair in Urology Tissue Engineering
2019	Associate Professor of Surgery, Dept. of Surgery, Harvard Medical School, Boston, MA
2012-2019	Assistant Professor of Surgery, Dept. of Surgery, Harvard Medical School, Boston, MA
2011-2019	Staff Scientist, Dept. of Urology, Boston Children's Hospital, Boston, MA
2007-2012	Instructor in Surgery, Dept. of Surgery, Harvard Medical School, Boston, MA

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

Gundogdu G, Morhardt D, Cristofaro V, Algarrahi K, Yang X, Costa K, Alegria CG, Sullivan MP, Mauney JR. Evaluation of Bilayer Silk Fibroin Grafts for Tubular Esophagoplasty in a Porcine Defect Model. *Tissue Eng Part A*. 2021 Jan;27(1-2):103-116. doi: 10.1089/ten.TEA.2020.0061. Epub 2020 Jun 26. PMID: 32460641; PMCID: PMC7826443.

Affas S, Schäfer FM, Algarrahi K, Cristofaro V, Sullivan MP, Yang X, Costa K, Sack B, Gharaee-Kermani M, Macoska JA, Gundogdu G, Seager C, Estrada CR Jr, Mauney JR. Augmentation Cystoplasty of Diseased Porcine Bladders with Bi-Layer Silk Fibroin Grafts. *Tissue Eng Part A*. 2019 Jun;25(11-12):855-866. doi: 10.1089/ten.TEA.2018.0113. Epub 2018 Oct 26. PMID: 30191762; PMCID: PMC6589503.

Algarrahi K, Affas S, Sack BS, Yang X, Costa K, Seager C, Estrada CR Jr, Mauney JR. Repair of injured urethras with silk fibroin scaffolds in a rabbit model of onlay urethroplasty. *J Surg Res*. 2018 Sep;229:192-199. doi: 10.1016/j.jss.2018.04.006. Epub 2018 May 1. PMID: 29936989; PMCID: PMC6022288.

Chung YG, Algarrahi K, Franck D, Tu DD, Adam RM, Kaplan DL, Estrada CR Jr, Mauney JR. The use of bi-layer silk fibroin scaffolds and small intestinal submucosa matrices to support bladder tissue regeneration in a rat model of spinal cord injury. *Biomaterials*. 2014 Aug;35(26):7452-9. doi: 10.1016/j.biomaterials.2014.05.044. Epub 2014

Other Significant Products, Whether or Not Related to the Proposed Project

Gundogdu G, Tosun M, Morhardt D, Gheinani AH, Algarrahi K, Yang X, Costa K, Alegria CG, Adam RM, Yang W, Mauney JR. Molecular mechanisms of esophageal epithelial regeneration following repair of surgical defects with acellular silk fibroin grafts. *Sci Rep*. 2021 Mar 29;11(1):7086. doi: 10.1038/s41598-021-86511-9. PMID: 33782465; PMCID: PMC8007829.

Schäfer FM, Algarrahi K, Savarino A, Yang X, Seager C, Franck D, Costa K, Liu S, Logvinenko T, Adam R, Mauney JR. Mode of Surgical Injury Influences the Source of Urothelial Progenitors during Bladder Defect Repair. *Stem Cell Reports*. 2017 Dec 12;9(6):2005-2017. doi: 10.1016/j.stemcr.2017.10.025. Epub 2017 Nov 22. PMID: 29

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

2013 NIH Reviewer, Special Emphasis Panel/Scientific Review Group ZDK1 GRB-9
2013-present Editorial Board, Biomedical Research International
2014, 2015 NIH Reviewer, Diabetics Consortium (DiaComp) Pilot and Feasibility Projects
2015-present Member-Society for Biomaterials
2015-present Member-Society for Basic Urologic Research
2018-2020 VA Reviewer, Special Emphasis Panel ZRD1 SURG-P

NAME: Linda Elizabeth May

POSITION TITLE & INSTITUTION: Associate Professor, Interim Department Chair, East Carolina University

A. PROFESSIONAL PREPARATION

(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Florida	Gainesville, FL	Sports Administration	BS	1995
University of Florida	Gainesville, FL	Exercise Physiology	MS	1998
Kent State University	Kent, OH	Physiology	PhD	2005

B. APPOINTMENTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2019-current	Interim Department Chair, Foundation Science & Research, East Carolina University (ECU)
2018-current	Associate Professor, Tenured, ECU
2014-current	Adjunct, Dept. of Obstetrics and Gynecology, Brody School of Medicine, ECU,
2013-current	Associate Graduate Faculty Member, ECU
2012-current	Adjunct- Department of Kinesiology, Health and Human Performance, ECU
2012-2012	Associate Professor, Dept. of Anatomy (non-tenure track), Kansas City University of Medicine and Biosciences (KCUMB)
2010-2012	Assistant Director of M2 Curriculum, College of Medicine, KCUMB
2006-2012	Course Director, College of Biosciences, KCUMB
2005-2010	Course Director of M1/M2 Curriculum, College of Medicine, KCUMB
2005-2012	Assistant Professor, Dept. of Anatomy (non-tenure track), KCUMB

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

- McDonald, S.M., Strom, C, Remchak, M, Chaves, A, Broskey, N, Isler, C., Haven, K., Newton, E.R., DeVente, J, Aparicio-Molina, V, May, L. (2020). The Effects of Aerobic Exercise on Markers of Maternal Metabolism During Pregnancy. *Birth Defects Journal*, 2020. Accepted- In print.
- McDonald, S.M., Isler, C., Haven, K., Newton, E.R., Strickland, D., Kuehn, D., Kelley, G., Chasan-Taber, L., May, L.E. (2020). The effects of moderate intensity aerobic exercise during pregnancy on one-month infant morphometry. *Birth Defects Journal: Invited Article*, In Print.
- May, L.E., McDonald, S.M., Jones, R., Forbes, L., Newton E.R., Strickland, D., Isler, C., Haven, K., Steed, D., Hartman, R., Sarno, L., Kelley, G.A., Chasan-Taber, L., , Kuehn, D. (2020). Influence of maternal aerobic exercise on fetal heart function: A randomized controlled trial. *AJOG-MFM*, In Print.
- Mamillapalli, SS, Smith-Joyner, A, Forbes, L, McIntyre, KS, Poppenfuse, S, Rushing, B, Strom, C, Danell, A, May, L, Kuehn, D Kew, K, Ravisankar, S., (2020). Screening for Opioids and Stimulant Exposure in utero using Targeted and Untargeted Metabolomics Analysis of Umbilical Cords. *Therapeutic Drug Monitoring Journal*, In Print.
- Roldan-Reoyo, O, Pelaez, M, May, LE, Barakat, R. (2019). Influence of Maternal Physical Exercise on Fetal and Maternal Heart Rate Responses. *German Journal of Sports & Exercise Review*
<https://doi.org/10.1007/s12662-019-00582-5>.

Other Significant Products, Whether or Not Related to the Proposed Project

- Gross McMillan, A, Isler, C, Kuehn, D, May, LE. (2019). The Effects of Exercise During Pregnancy on Infant Neuromotor Skills at One Month of Age. *MSSE* 51(8): 1671-1676.
- Clark, E, Isler, C, Strickland, D, Gross McMillan, A, Fang, X, Kuehn, D, Ravisankar, S, Strom, C May, L. (2019). Influence of Aerobic Exercise on Maternal Lipid Levels and Offspring Morphometrics. *Int J Obes*
- McDonald, S, Satterfield, N, May, LE, Newton, E, Livingston, J, Fang, X. (2018). Influence of Exercise in Pregnancy on Fetal Heart Response during Labor and Delivery. *Health Sci Rep*. 2018 Aug 13;1(10):e81.
- Purdy G, James M, Wakefield P, Skow RJ, van Diepen S, May LE, et al. (2018). Maternal cardioautonomic responses during & following exercise throughout pregnancy. *APNM*,42(S2): S95, 2018.
- Suminski RR, Taylor WC, May LE and Blair RI. Primary Care Provider's Consideration of Environmental

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f\(i\)\(d\)](#))

1. One of our recent publications has received national news attention (i.e. New York Times, Good Morning America), which highlights the public interest in this topic.
2. Our team has been interviewed for various Blogs and Podcasts (e.g. Born to Be Breastfed, ACSM Blog, AJP-Heart & Circulation podcast) highlighting the public and scientific interest in the topic.
3. Our team has also been interviewed by various media outlets (e.g. Svenska Dagladet, Fox in New York City) related to this topic.
4. we have provided various invited lectures at other universities (e.g. Swansea University, University of Alberta, University of Utah) and locations (e.g. Pitt County Health Department, ECU OB/Gyn Grand Rounds) to educate others about the topic.

NAME: Pamela A. Moalli

POSITION TITLE & INSTITUTION: Professor, University of Pittsburgh, UPMC Magee-Womens Hospital

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Brown University	Providence, RI	Biology	BA w/Distinction	1985
Northwestern University NIH Medical Scientist Training Program	Evanston, IL	PhD, Molecular & Cellular Biology (honors)	MD, PhD	1994
Magee-Womens Hospital	Pittsburgh, PA	Obstetrics & Gynecology	Residency	1998
Magee-Womens Hospital	Pittsburgh, PA	Urogynecology & Pelvic Surgery	Fellowship	2000

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2020- 2019-	Department of Molecular and Cellular Pathology, University of Pittsburgh-Graduate Faculty Director of the Division of Urogynecology and Reconstructive Pelvic Surgery, Dept of Ob/GynRS, UPMC Magee-Womens Hospital, University of Pittsburgh School of Medicine
2018-	Department of Obstetrics, Gynecology and Reproductive Sciences, UPMC Magee-Womens Hospital, University of Pittsburgh School of Medicine – Professor (tenure)
2016- 2016-	Member Scientific Review Panel for SBIR-STTR ZRG1 DKUS-G Special Emphasis Panel Chair Pelvic Floor Disorders Registry Scientific Committee
2015-2017	Member of Scientific Review Special Emphasis Panel Urological and Urogynecological Sciences
2013-	Chair AUGS Mesh Special Interest Research Group
2012-	Member Pelvic Floor Disorders Registry Scientific Committee
2012-2013	Vice Chair AUGS Mesh Special Interest Research Group
2011-	Department of Bioengineering, Carnegie Mellon University - Adjunct Associate Professor (Secondary Appointment)
2008-2012	Director Basic Science AUGS foundation
2009-	McGowan Institute of Regenerative Medicine, University of Pittsburgh (Secondary)
2007-	Department of Bioengineering, University of Pittsburgh – Associate Professor (Secondary)

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

Dr. Moalli is the author of 95 refereed journal articles, 22 peer reviewed collaborative journal articles in which Dr. Moalli is a network contributor, 13 book chapters, and 136 conference abstracts.

1. Nolfi A, Brown BN, Liang R, Palcsey SL, Bonidie MJ, Abramowitch SD, Moalli PA. Host response to synthetic mesh in women with mesh complications. *Am J Obstet Gynecol.* 2016;215(2):206.e1-206.e2068. doi:10.1016/j.ajog.2016.04.008
2. Liang R, Knight K, Easley D, Palcsey S, Abramowitch S, Moalli PA. Towards rebuilding vaginal support utilizing an extracellular matrix bioscaffold. *Acta Biomater.* 2017 Jul 15;57:324-333. doi: 10.1016/j.actbio.2017.05.015. Epub 2017 May 6. PMID:PMC5639927
3. Shaffer RM, Liang R, Knight K, Carter-Brooks CM, Abramowitch S, Moalli PA. Impact of Polypropylene Prolapse Mesh on Vaginal Smooth Muscle in Rhesus Macaque. *Am J Obstet Gynecol.* 2019 May 15. pii: S0002-9378(19)30666-0. doi: 10.1016/j.ajog.2019.05.008. [Epub ahead of print] PMID: PMC6863072
4. Artsen AM, Rytel M, Liang R, King GE, Meyn L, Abramowitch SD, Moalli PA. Mesh induced fibrosis: The protective role of T regulatory cells. *Acta Biomater.* 2019 Jul 19. pii: S1742-7061(19)30520-3. doi: 10.1016/j.actbio.2019.07.031. [Epub ahead of print] PMID:PMC6717663
5. Artsen AM, Liang R, Meyn L, Rytel M, Palcsey S, Abramowitch SD, Moalli PA. T regulatory cells and TGF- β 1: Predictors of the host response in mesh complications [published online ahead of print, 2020 Aug 7]. *Acta Biomater.* 2020;S1742-7061(20)30448-7. doi:10.1016/j.actbio.2020.07.051

Other Significant Products, Whether or Not Related to the Proposed Project

1. Oliphant S, Canavan T, Palcsey S, Meyn L, Moalli P. Pregnancy and parturition negatively impact vaginal angle and alters expression of vaginal MMP-9. *Am J Obstet Gynecol.* 2018
2. Liang R, Knight K, Barone W, Powers RW, Nolfi A, Palcsey S, Abramowitch S, Moalli PA. Extracellular matrix regenerative graft attenuates the negative impact of polypropylene prolapse mesh on vagina in rhesus macaque. *Am J Obstet Gynecol.* 2017 Feb; 216(2): 153.e1–153.e9. PMID:PMC5290183
3. Sung VW, Borello-France D, Newman DK, Richter HE, Lukacz ES, Moalli P, Weidner AC, Smith AL, Dunivan G, Ridgeway B, Nguyen JN, Mazloomdoost D, Carper B, Gantz MG; NICHD Pelvic Floor Disorders Network. Effect of Behavioral and Pelvic Floor Muscle Therapy Combined with Surgery vs Surgery Alone on Incontinence Symptoms Among Women with Mixed Urinary Incontinence: The ESTEEM Randomized Clinical Trial. *JAMA* 2019

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

Director of the Division of Urogynecology and Reconstructive Pelvic Surgery at the University of Pittsburgh in the Department of Obstetrics & Gynecology. Director of clinical division with 9 faculty, 4 physician assistants and 20 person staff. Personally performs over 200 surgeries and 500 new consultations annually on women with pelvic floor disorders.

Alternate PI for University of Pittsburgh Pelvic Floor Disorders Network, a consortium of 8 centers across the United States that perform collaborative clinical trials to improve outcomes for women with pelvic floor disorders. Chair of National Registry for Treatment of Pelvic Organ Prolapse. Oversee a national multi-center registry that follows women treated for pelvic organ prolapse up to 36 months at 12 sites throughout the United States following surgical versus pessary management. Peer Reviewer – NIH - NICHD, NIDDK

NAME: Myers, Kristin

POSITION TITLE & INSTITUTION: Associate Professor of Mechanical Engineering, Columbia University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Michigan	Ann Arbor, MI	Mechanical Engineering	BS	2002
Massachusetts Institute of Technology	Cambridge, MA	Mechanical Engineering	MS	2005
			PhD	2008
Massachusetts Institute of Technology	Cambridge, MA	Mechanical Engineering	PhD	
Johns Hopkins University	Baltimore, MD	Mechanical Engineering	Postdoctoral Fellow	2008 - 2010

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2015 - Present	Associate Professor of Mechanical Engineering, Columbia University in the City of New York, New York, NY
2010 - 2015	Assistant Professor of Mechanical Engineering, Columbia University in the City of New York, New York, NY
2008 - 2010	Postdoctoral Researcher, Johns Hopkins University, Baltimore, MD
2002 - 2008	Graduate Research Assistant, Massachusetts Institute of Technology, Cambridge, MA 2000 - 2002 Undergraduate Research Assistant, University of Michigan, Ann Arbor , MI

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Yoshida K, Jayyosi C, Lee N, Mahendroo M, Myers KM. Mechanics of cervical remodelling: insights from rodent models of pregnancy. *Interface Focus*. 2019 Oct 6;9(5):20190026. PubMed PMID: 31485313; PubMed Central PMCID: PMC6710664.
2. Westervelt AR, Fernandez M, House M, Vink J, Nhan-Chang CL, Wapner R, Myers KM. A Parameterized Ultrasound-Based Finite Element Analysis of the Mechanical Environment of Pregnancy. *J Biomech Eng*. 2017 May 1;139(5)PubMed PMID: 28303276; PubMed Central PMCID: PMC7104753.
3. Yoshida K, Mahendroo M, Vink J, Wapner R, Myers K. Material properties of mouse cervical tissue in normal gestation. *Acta Biomater*. 2016 May;36:195-209. PubMed PMID: 26961804.
4. Fernandez M, House M, Jambawalikar S, Zork N, Vink J, Wapner R, Myers K. Investigating the mechanical function of the cervix during pregnancy using finite element models derived from high- resolution 3D MRI. *Comput Methods Biomech Biomed Engin*. 2016;19(4):404-17. PubMed PMID: 25970655; PubMed Central PMCID: PMC4644115.
5. Yoshida K, Jiang H, Kim M, Vink J, Cremers S, Paik D, Wapner R, Mahendroo M, Myers K. Quantitative evaluation of collagen crosslinks and corresponding tensile mechanical properties in mouse cervical tissue during normal pregnancy. *PLoS One*. 2014;9(11):e112391. PubMed PMID: 25397407; PubMed Central PMCID: PMC4232411.

Other Significant Products, Whether or Not Related to the Proposed Project

1. Shi L, Yao W, Gan Y, Zhao LY, Eugene McKee W, Vink J, Wapner RJ, Hendon CP, Myers K. Anisotropic Material Characterization of Human Cervix Tissue Based on Indentation and Inverse Finite Element Analysis. *J Biomech Eng*. 2019 Sep 1;141(9)PubMed PMID: 31374123; PubMed Central PMCID: PMC6808002.
2. Westervelt AR, Myers KM. Computer modeling tools to understand the causes of preterm birth. *Semin Perinatol*. 2017 Dec;41(8):485-492. PubMed PMID: 28958628; PubMed Central PMCID: PMC7357816.
3. Myers KM, Elad D. Biomechanics of the human uterus. *Wiley Interdiscip Rev Syst Biol Med*. 2017 Sep;9(5) PubMed PMID: 28498625.
4. Myers KM, Hendon CP, Gan Y, Yao W, Yoshida K, Fernandez M, Vink J, Wapner RJ. A continuous fiber distribution material model for human cervical tissue. *J Biomech*. 2015 Jun 25;48(9):1533-40.

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

1. Associate Editor, *Computer Methods in Biomechanics and Biomedical Engineering* (Feb 2020 – present)
2. Session co-chair, *Engineering Innovation in Women's Health*, National Academy of Engineering Frontiers in Engineering (Feb 2021)
3. Special Issues co-Editor (2 issues), *Bioengineering in Women's Health*, *Journal of the Royal Society Interface Focus* (Sep 2019, Oct 2019)
4. Local Arrangements Chair, 16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering and the 4th Conference on Imaging and Visualization, New York, NY (Aug 2019)
5. Faculty mentor (6 high school girls), Summer Research Experience for High School Students: Engineering the Next Generation, School of Engineering and Applied Science, Columbia University (Summers 2015-2017)

NAME: Christine Mary O'Brien

POSITION TITLE & INSTITUTION: Assistant Professor, Biomedical Engineering (effective July 1, 2022)

A. PROFESSIONAL PREPARATION - (see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Missouri, Columbia	Columbia, MO, USA	Bioengineering	BS	2010
Vanderbilt University	Nashville, TN, USA	Biomedical Engineering	PhD	2017
Washington University in St. Louis	St. Louis, MO, USA	Biomedical Imaging	Post-Doctoral Fellow	10/2017 - 6/2022

B. APPOINTMENTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
7/2022 - Present	Assistant Professor of Biomedical Engineering, Washington University in St. Louis
2021 - 2022	Instructor, Washington University in St. Louis
2018 - 2021	Postdoctoral Research Scholar, Biomedical Imaging, Washington University in St. Louis
2011 - 2014	NSF GRFP Fellow, Vanderbilt University, Nashville TN
2011 - 2017	Graduate Research Assistant, Vanderbilt University, Nashville TN
2009 - 2011	Undergraduate Research Assistant, University of Missouri Columbia
Summer 2008	NSF REU Fellow, University of Cincinnati

C. PRODUCTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#)) Products Most Closely Related to the Proposed Project

1. O'Brien CM, Herington JL, Brown N, Pence IJ, Paria BC, Slaughter JC, Reese J, Mahadevan-Jansen A., In vivo Raman spectral analysis of impaired cervical remodeling in a mouse model of delayed parturition. *Sci Rep.* 2017 Jul 28;7(1):6835. PubMed Central PMCID: PMC5533720.
2. O'Brien CM, Cochran KJ, Masson LE, Goldberg M, Marple E, Bennett KA, Reese J, Slaughter JC, Newton JM, Mahadevan-Jansen A. Development of a visually guided Raman spectroscopy probe for cervical assessment during pregnancy. *J Biophotonics.* 2019 Feb;12(2):e201800138. PubMed Central PMCID: PMC6578580.
3. O'Brien CM, Vargis E, Rudin A, Slaughter JC, Thomas G, Newton JM, Reese J, Bennett KA, Mahadevan-Jansen A. In vivo Raman spectroscopy for biochemical monitoring of the human cervix throughout pregnancy. *Am J Obstet Gynecol.* 2018 May;218(5):528.e1-528.e18. PubMed Central PMCID: PMC5916496.
4. Masson LE, O'Brien CM, Pence IJ, Herington JL, Reese J, van Leeuwen TG, Mahadevan-Jansen A., Dual excitation wavelength system for combined fingerprint and high wavenumber Raman spectroscopy. *Analyst.* 2018 Dec 3;143(24):6049-6060. PubMed Central PMCID: PMC6295447.
5. O'Brien CM, Cochrane K, Mahadevan-Jansen A, Finley KR, Stokes W, Hays L, Tejani M, Crowe A., inventors. Washington University in St. Louis, assignee. Method, system and speculum-free optical probe for optical assessment of cervix, and applications of same. United States 16/613,445. 2021 June 03.

Other Significant Products, Whether or Not Related to the Proposed Project

1. O'Brien CM, Rood KD, Bhattacharyya K, DeSouza T, Sengupta S, Gupta SK, Mosley JD, Goldschmidt BS, Sharma N, Viator JA. Capture of circulating tumor cells using photoacoustic flowmetry and two phase flow. *J Biomed Opt.* 2012 Jun;17(6):061221. PubMed Central PMCID: PMC3381020.
2. Herington JL, O'Brien C, Robuck MF, Lei W, Brown N, Slaughter JC, Paria BC, Mahadevan-Jansen A, Reese J., Prostaglandin-Endoperoxide Synthase 1 Mediates the Timing of Parturition in Mice Despite Unhindered Uterine Contractility. *Endocrinology.* 2018 Jan 1;159(1):490-505. PubMed Central PMCID: PMC5761592.
3. Robuck MF, O'Brien CM, Knapp KM, Shay SD, West JD, Newton JM, Slaughter JC, Paria BC, Reese J, Herington JL. Monitoring uterine contractility in mice using a transcervical intrauterine pressure catheter. *Reproduction.* 2018 May;155(5):447-456. PubMed Central PMCID: PMC5903945.
4. O'Brien CM, Meng H, Shmuylovich L, Carpenter J, Gogineni P, Zhang H, Bishop K, Mondal SB, Sudlow GP, Bethea C, Bethea C, Achilefu S. Focal dynamic thermal imaging for label-free high-resolution characterization of materials and tissue heterogeneity. *Sci Rep.* 2020 Jul 28;10(1):12549. PubMed Central PMCID: PMC7387563.
5. Ayala OD, Doster RS, Manning SD, O'Brien CM, Aronoff DM, Gaddy JA, Mahadevan-Jansen A. Raman microspectroscopy differentiates perinatal pathogens on ex vivo infected human fetal membrane tissues. *J Biophotonics.* 2019 Sep;12(9):e201800449. PubMed Central PMCID: PMC6902120.

D. SYNERGISTIC ACTIVITIES - (see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

1. Curriculum development and hands-on outreach with "Black Girls Do STEM", a St. Louis based non-profit organization whose mission is to trigger an increased curiosity through deliberate education, access and opportunity of STEM within the minds of black girls in every community.
2. Research mentorship of 8 undergraduate and 5 graduate students over the past six years, including 7 women and 5 underrepresented minority students, many of which have been accepted by their first choice graduate school, medical school, postdoctoral position, or industry job.
3. Manuscript reviewer for five peer-reviewed biomedical research journals
4. Science advocacy including multiple trips to Washington DC to speak with members of congress about the importance of funding for scientific research including expansion of women's health research.
5. Curriculum development following the "Legacy Cycle" pedagogical model for biomedical optics training modules.

NSF BIOGRAPHICAL SKETCH

NAME: Oyen, Michelle

NSF ID: 000786102@nsf.gov

ORCID: 0000-0002-3428-748X

POSITION TITLE & INSTITUTION: Associate Professor, Washington University in St. Louis

(a) PROFESSIONAL PREPARATION -(see PAPPG Chapter II.C.2.f.(a))

INSTITUTION	LOCATION	MAJOR / AREA OF STUDY	DEGREE (if applicable)	YEAR YYYY
Michigan State University	East Lansing, MI	Materials Science and Engineering	BS	1996
Michigan State University	East Lansing, MI	Engineering Mechanics	MS	1998
University of Minnesota	Minneapolis, MN	Biophysical Sciences and Medical Physics	PHD	2005
University of Virginia	Charlottesville, VA		Postdoctoral Fellow	2005 - 2006

(b) APPOINTMENTS -(see PAPPG Chapter II.C.2.f.(b))

2022 - present Associate Professor, Washington University in St. Louis

2018 - 2021 Associate Professor, East Carolina University, Greenville, NC

2013 - 2018 University Reader, University of Cambridge, Cambridge

2006 - 2013 University Lecturer, University of Cambridge, Cambridge

(c) PRODUCTS -(see PAPPG Chapter II.C.2.f.(c))

Products Most Closely Related to the Proposed Project

1. Oyen ML, Calvin SE, Landers DV. Premature rupture of the fetal membranes: is the amnion the major determinant?. *Am J Obstet Gynecol.* 2006 Aug;195(2):510-5. PubMed PMID: [16647685](#).
2. Abbas Y, Oefner CM, Polacheck WJ, Gardner L, Farrell L, Sharkey A, Kamm R, Moffett A, Oyen ML. A microfluidics assay to study invasion of human placental trophoblast cells. *J R Soc Interface.* 2017 May;14(130) PubMed Central PMCID: [PMC5454302](#).
3. Plitman Mayo R, Charnock-Jones DS, Burton GJ, Oyen ML. Three-dimensional modeling of human placental terminal villi. *Placenta.* 2016 Jul;43:54-60. PubMed PMID: [27324100](#).
4. Abbas Y, Carnicer-Lombarte A, Gardner L, Thomas J, Brosens JJ, Moffett A, Sharkey AM, Franze K, Burton GJ, Oyen ML. Tissue stiffness at the human maternal-fetal interface. *Hum Reprod.* 2019 Oct 2;34(10):1999-2008. PubMed Central PMCID: [PMC6809602](#).
5. Wheeler ML, Oyen ML. Premature Rupture of Membranes and Severe Weather Systems. *Front Physiol.* 2020;11:524. PubMed Central PMCID: [PMC7264092](#).

Other Significant Products, Whether or Not Related to the Proposed Project

1. Trappmann B, Gautrot JE, Connelly JT, Strange DG, Li Y, Oyen ML, Cohen Stuart MA, Boehm H, Li B, Vogel V, Spatz JP, Watt FM, Huck WT. Extracellular-matrix tethering regulates stem-cell fate. *Nat Mater.* 2012 May 27;11(7):642-9. PubMed PMID: [22635042](#).
2. Islam M, Oyen M. Load-Relaxation Characteristics of Chemical and Physical Hydrogels as Soft

Tissue Mimics. *Experimental Mechanics*. 2021 March 17; :- Available from:
<http://link.springer.com/10.1007/s11340-021-00712-x> DOI: 10.1007/s11340-021-00712-x

3. Yao W, Yoshida K, Fernandez M, Vink J, Wapner R, Ananth C, Oyen M, Myers K. Measuring the compressive viscoelastic mechanical properties of human cervical tissue using indentation. *Journal of the Mechanical Behavior of Biomedical Materials*. 2014 June; 34:18-26. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1751616114000174> DOI: 10.1016/j.jmbbm.2014.01.016
4. Koh C, Tonsomboon K, Oyen M. Fracture toughness of human amniotic membranes. *Interface Focus*. 2019 August 16; 9(5):20190012-. Available from: <https://royalsocietypublishing.org/doi/10.1098/rsfs.2019.0012> DOI: 10.1098/rsfs.2019.0012
5. Oyen M. Mechanical characterisation of hydrogel materials. *International Materials Reviews*. 2013 December 05; 59(1):44-59. Available from: <http://www.tandfonline.com/doi/full/10.1179/1743280413Y.0000000022> DOI: 10.1179/1743280413Y.0000000022

(d) SYNERGISTIC ACTIVITIES -(see PAPPG Chapter II.C.2.f.(d))

1. Developed a novel framework for teaching Biomimetics via an open-ended group project with design and prototyping elements, implemented at both Cambridge University (2008-18) and East Carolina University (2019-present)
2. Presented scientific lectures (e.g. Cambridge Science Festival) for a general audience.
3. Featured in magazines (e.g. Wired UK) explaining bioengineering research to a general audience.
4. Faculty advisor for developing a new chapter of Robogals at the University of Cambridge, for promoting robotics and computer programming to female junior high and high school students.
5. Presented documentary TV segments (BBC's "CBeebies") for communicating science to children.

NAME: Itsik Pe'er

POSITION TITLE & INSTITUTION: Associate Professor, Columbia University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Tel Aviv University	Tel Aviv, Israel	Math, computer science	B.S.	1990
Tel Aviv University	Tel Aviv, Israel	Computer Science	M.S.	07/1995
Tel Aviv University	Tel Aviv, Israel	Causal Inference	Ph.D.	01/2002
Weizmann Institute of Science, Rehovot	Israel	Molecular genetics	Postdoctoral	08/2003
Broad Institute	Cambridge, MA	Medical & population genetics	Postdoctoral	08/2006

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
1991-1997	Intelligence Officer, Israeli Defense Force, Israel
1992-1996	Teaching Assistant, School of Computer Science, Tel Aviv University, Israel Computational Complexity, Algorithms in Molecular Biology
1998-2000	Teaching Assistant, School of Computer Science, Tel Aviv University, Israel Programming Workshops in Bioinformatics
2001-2002	Founder & Chief Technology Officer, Tulip Bioinformatics, Ramat Gan, Israel
2002-2003	Postdoctoral Research, Dept. Molecular Genetics, Weizmann Inst. of Science, Rehovot, Israel
2003-2006	Postdoctoral research, Broad Institute, Whitehead Institute for Biomedical Research and Massachusetts General Hospital, under the supervision of David Altshuler and Mark Daly
2006-2011	Assistant professor, Department of Computer Science, Columbia University
2011-2013	Associate professor, Department of Computer Science, Columbia University
2013- Present	Associate professor with tenure, Department of Computer Science, Columbia University
2015	Consultant, 23&Me Inc. (sabbatical)
2016- Present	Chair of the Center for Health Analytics, Data Science Institute

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Shenhav L, Thompson L, Joseph TA, ..., Pe'er I, Halperin E (2019) FEAST: fast expectation-maximization for microbial source tracking, Nat. Methods 16 (7), 627, NIHMSID1637086
2. Joseph TA, Pasarkar AP, Pe'er I (2020) Efficient and accurate inference of microbial trajectories from longitudinal count data. Cell Systems, 10 (6), 463-469. e6, NIHMSID:1637097
3. Joseph TA, Shenhav L, ..., Pe'er I (2020) Compositional Lotka-Volterra describes microbial dynamics in the simplex. PLoS Computational Biology. 16 (5), e1007917, PMC7325845
4. Moretti AK, Wang Z, Wu L, Drori I, Pe'er I, (2020) Variational Objectives for Markovian Dynamics with Backward Simulation Proceedings of the 24th European Conference on Artificial Intelligence
5. Moretti AK, Zhang L, Pe'er I, (2020) Variational Combinatorial Sequential Monte Carlo for Bayesian Phylogenetic Inference Proceeding of the 15th meeting for Machine Learning in Computational Biology

Other Significant Products, Whether or Not Related to the Proposed Project

1. Carmi S, Pe'er I (2014) Sequencing an Ashkenazi reference panel supports population-targeted personal genomics & illuminates Jewish & European origins, Nat Commun.
2. Palamara PF, Lencz T, Darvasi A, Pe'er I (2012) Length distributions of identity by descent reveal fine-scale demographic history. AJHG.
3. Joseph TA, Pe'er I (2019) Inference of Population Structure from Time-Series Genotype Data. AJHG
4. Erlich Y, Shor T, Pe'er I, Carmi S (2018) Identity inference of genomic data using long-range familial searches, Science
5. Gusev A, Pe'er I (2009) Whole population, genome-wide mapping of hidden relatedness, Genome research

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

Leads The Ashkenazi Genome Consortium (TAGC)

Chair of the Health Analytics Center of the Institute for Data Sciences and Engineering

Faculty liaison for student organizations (CS Preprofessional Society and local chapter of ACM)

Developed a class in Computational Genomics and a MSc track, which I am the director of

Additional taught classes: Introduction to Data Science (MOOC, co-taught); Machine Learning; Introduction to Computer Science for biologists

NAME: Valerie Purdie Greenaway

POSITION TITLE & INSTITUTION: Associate Professor of Psychology, Columbia University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Columbia University	New York, NY	Psychology	B.A.	1993
Stanford University	Stanford, CA	Psychology	Ph.D.	2004

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2014 - Present	Associate Professor of Psychology, Columbia University, New York, NY
2009 - 2014	Assistant Professor of Psychology, Columbia University, New York, NY
2004 - 2009	Assistant Professor of Psychology, Yale University, New Haven, CT
1993 - 1997	Director, "I Have a Dream" Foundation, Stamford, Connecticut

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Turetsky, K.M., Purdie-Greenaway, V., Cook, J.E., Curley, J.P., & Cohen, G.L. (2020). A psychological intervention strengthens students' peer social networks and promotes persistence in STEM. *Science Advances*, 6 (45). eaba9221.
2. Purdie-Greenaway, V., & Turetsky, K. M. (2020). Socioecological diversity and inclusion: A framework for advancing diversity science. *Current Opinion in Psychology*, 32, 171–176.
3. Powers, J., Cook, J. E., Purdie-Vaughns, V., Garcia, J., Apfel, N., & Cohen, G. L. (2016). Changing environments by changing individuals: The emergent effects of psychological intervention. *Psychological Science*, 27(2), 150-160.
4. Williams, D.R., & Purdie-Vaughns, V. (2016). Needed interventions to reduce racial/ethnic disparities in health, *Journal of Health Politics, Policy and Law*, 41(4), 627-651.
5. Williams, D.R., & Purdie-Vaughns, V. (2015). Social and behavioral interventions to improve health and reduce disparities in health. In R.M. Kaplan, M.L. Spittel & D.H. David, (Eds.), *Population Health: Behavioral and Social Science Insights*, 51-68, NIH Office of Behavioral and Social Science Research.

Other Significant Products, Whether or Not Related to the Proposed Project

1. Yeager, D.S., Purdie-Vaughns, V., †Yang, S., & Cohen, G.L. (2017). Loss of institutional trust among racial and ethnic minority adolescents: Consequence of procedural injustice, cause of behavioral disengagement. *Child Development*, 88(2), 658-676.
2. Cook, J.E., Purdie-Vaughns, V., Meyer, I., & Busch, J.T.A. (2014). Intervening within and across levels: A multilevel approach to stigma and public health. *Social Science & Medicine*, 103, 101-109.
3. Purdie-Vaughns, V., & Ditlemann, R. (2010). Reflections on diversity science in social psychology. *Psychological Inquiry*, 21(2), 153-159.
4. Mohr, R., & Purdie-Vaughns, V. (2015). Diversity within women of color: Why experiences change felt stigma, *Sex Roles*, 7(9-10), 391-398.

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

Task Force Member, The Search Institute, 2021

Member, Chimney Corners Camp for Girls Task Force on Diversity, Equity, Anti-Racism & Inclusion, 2020 -
Incoming Associate Editor, *Psychological Review*, 2021

Editorial Board, *Journal of Experimental Social Psychology*, 2014-2015

Social Psychology Program Chair, American Psychological Society

NAME: Lori Setton

POSITION TITLE & INSTITUTION: Professor and Chair of Biomedical Engineering

A. PROFESSIONAL PREPARATION - (see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Princeton University	Princeton, NJ	Mechanical/Aero Engng	B.S.E.	1984
Columbia University	New York, NY	Mechanical Engng	M.S.	1988
Columbia University	New York, NY	Mechanical Engng	Ph.D.	1993
Columbia University College of Physicians & Surgeons, New York, NY	New York, NY	Orthopedic Research	Res Assoc	1994

B. APPOINTMENTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2017- pres.	Department Chair of Biomedical Engineering, Washington Univ in St. Louis, MO
2015- pres.	Lucy & Stanley Lopata Professor of Biomedical Engineering, Washington Univ in St. Louis, MO
2016- 2017	Director of Doctoral Studies, Biomedical Engineering, Washington Univ in St. Louis, MO
2015- 2018	Adjunct Professor of Biomedical Engineering, Duke University, NC
2007- 2015	William Bevan Distinguished Professor of Biomedical Engineering, Duke University, NC
2007- 2015	Associate Professor, (secondary appt.) Department of Mechanical Engineering, Duke University, NC
2004- 2015	Associate Professor, (joint appt.) Department of Orthopaedic Surgery, Duke University Medical Center, NC
2001- 2007	Mary Milius Yoh and Harold L. Yoh Jr. Associate Professor, Department of Biomedical Engineering, Duke University, NC
1995- 2001	Assistant Professor, Department of Biomedical Engineering, Duke University, NC
1995- 2004	Assistant Research Professor (secondary appt.), Division of Orthopaedic Surgery, Department of Surgery, Duke University Medical Center, NC

C. PRODUCTS - (see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#)) Products Most Closely Related to the Proposed Project

(undergraduate authors indicated with *)

Peer Reviewed Scientific Journal Publications

- 1) Setton LA and Chen J (2006): Mechanobiology of the intervertebral disc and relevance to disc degeneration, *Journal of Bone and Joint Surgery Am.* 88 Suppl 1(Pt 2):52-7.
- 2) Elliott DM and Setton LA (2001): Anisotropic and inhomogeneous tensile behavior of the human annulus fibrosus: Experimental measurement and material model predictions. *Journal of Biomechanical Engineering*, 123:256-263.
- 3) Bowles RD and Setton LA (2017). Biomaterials for Intervertebral Disc Regeneration and Repair. *Biomaterials* 129:54-67. PMC5627607.
- 4) Francisco AT, Mancino RJ, Bowles RD, Brunger JM, Tainter DM, Chen Y, Richardson WJ, Guilak F and LA Setton (2013). Injectable laminin-functionalized hydrogel for nucleus pulposus regeneration. *Biomaterials*, 34 (30):7381-8. PMC3771102.
- 5) Tang R, Jing L, Willard VP, Wu C, Guilak F, Chen J and LA Setton (2018). Differentiation of human induced pluripotent stem cells (iPSCs) into nucleus pulposus-like cells. *Stem Cell Research & Therapy*. Mar 9;9(1):61.

Commentary and Editorials

- 1) Stevens KR, Masters KR, Imoukhuede PI, Haynes KA, Setton LA, Cosgriff-Hernandez E, Lediju Bell MA, Rangamani P, Sakiyama-Elbert SE, Finley SD, Willits RK, Koppes AN, Chesler NC, Christman KL, Allen JB, Wong JY, El-Samad H, Desai TA, Eniola-Adefeso O (2021). Fund Black scientists. *Cell*, 184:561-565. PMID: 33503447.
- 2) White JA, Gaver DP, Butera RJ Jr, Choi B, Dunlop MJ, Grande-Allen KJ, Grosberg A, Hitchcock RW, Huang-Saad AY, Kotche M, Kyle AM, Lerner AL, Linchan JH, Linsenmeier RA, Miller MI, Papin JA, Setton L, Sgro A, Smith ML, Zaman M, Lee AP (2020). Core Competencies for Undergraduates in Bioengineering and Biomedical Engineering: Findings, Consequences, and Recommendations. *Ann Biomedical Engng*, 2020 Mar;48 (3):905-912. PMID: 32026231.
- 3) Roundtable on the Role of Disc Degeneration in Neck and Back Pain, Meeting Summary 2014. <https://www.niams.nih.gov/about/meetings-events/roundtables/roundtable-role-disc-degeneration-neck-and-back-pain>
- 4) Setton LA, Yin FC, Margulies SS, Sakiyama-Elbert SE, Beizer D (2012). Getting Your Research Out There: Open Access & More. *Ann Biomedical Engng* 40(12):2503-4.

Other Significant Products, Whether or Not Related to the Proposed Project

D. SYNERGISTIC ACTIVITIES - (see PAPPG Chapter II.C.2.f.(i)(d))

- Advisory Committee, Interdisciplinary Training in Mechanobiology (2014-19), Washington University
- Mentored undergraduate student chapters of Biomedical Engineering Society, Society of Professional Engineers (Duke Univ), chaired Student Affairs Committee (BMES)
- President of Biomedical Engineering Society (BMES) - led partnership with NSBE to increase professional engineers involvement in BMES
- Supported black student involvement in Annual Meeting of the BMES with grants from Washington University
- Established Chair's Diversity Fellowship to increase representation of minorities in graduate programs
- Developed & taught more than 10 distinct undergraduate courses in biomedical engineering (Washington University)

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For synergistic activities I am copying
and pasting a list of up to five distinct
examples that demonstrate the broader
impact of the individual's professional
and scholarly activities that focus on
the integration and transfer of
knowledge as well as its creation.
Synergistic activities should be specific
and must not include multiple

NAME: Gordana Vunjak-Novakovic

POSITION TITLE & INSTITUTION: University Professor, Columbia University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Belgrade	Belgrade, Serbia	Chemical Engineering	B.S.	1972
University of Belgrade	Belgrade, Serbia	Chemical Engineering	M.S.	1975
University of Belgrade	Belgrade, Serbia	Chemical Engineering	Ph.D	1980
MIT	Cambridge MA	Biomedical Engineering	Fulbright Fellowship	1986-1987

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2020 - Present	Director, Tissue Engineering Resource Center, Columbia University, New York NY
2020 - Present	Director, Center for Dental and Craniofacial Research, Columbia University, New York NY
2019 - Present	Professor, College of Dental Medicine, Columbia University, New York NY
2018 - Present	Affiliate member, Mortimer B Zuckerman Mind Brain Behavior Institute, Columbia University, New York NY
2017 - Present	University Professor, Columbia University, New York NY
2015 - Present	Faculty, Irving Comprehensive Cancer Center, Columbia University, New York NY
2014 - Present	The Mikati Foundation Professor of Biomedical Engineering, Columbia University, New York NY
2011 - Present	Professor of Medical Sciences (in Medicine), Columbia University, New York NY
2011 - Present	Professor, Columbia University, Department of Biomedical Engineering, New York NY
2005 - Present	Principal Research Scientist, Harvard – MIT Division of Health Sciences and Technology, MIT, Cambridge MA
1998 - 2005	Adjunct Professor, Department of Chemical and Biological Engineering, Tufts University, Medford MA
1994 - 2017	Medford MA
1980 - 1993	Professor of Chemical Engineering, University of Belgrade, Serbia

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Ronaldson - Bouchard K, Ma S, Chen T, Yeager K, Sirabella D, Song LJ, Yazawa M and Vunjak-Novakovic G. Advanced maturation of human cardiac tissue grown from pluripotent stem cells. *Nature*, 556(7700): 239-243, 2018.
2. Ronaldson-Bouchard K. and Vunjak-Novakovic G. Organs on a Chip: a fast-track for engineered tissues in drug development. *Cell Stem Cell* 22(3): 310-324, 2018.
3. Zhao Y, Rafatian N, Feric N, Cox B, Aschar-Sobbi R, Zhang B, Wang EY, Aggarwal P, Zhang B, Conant G, Ronaldson-Bouchard K, Pahnke A, Protze S, Lee JH, Huyer LD, Jekic D, Wickeler A, Naguib H, Keller GM, Vunjak-Novakovic G, Broeckel U, Backx PH and Milica Radisic. A platform for generation of chamber-specific cardiac tissues and disease modeling. *Cell* 176, 913–927, 2019.
4. Liu B, Lee BW, Nakanishi K, Villasante A, Williamson R, Metz J, Kim J, Kanai M, Bi L, Brown K, Di Paolo G, Homma S, Sims PA, Topkara VK, Vunjak-Novakovic G. Cardiac recovery via extended cell-free delivery of extracellular vesicles secreted by cardiomyocytes derived from iPS cells. *Nature Biomedical Engineering* 2:293-303, 2018.
5. Lock R, Al Asafen H, Fleischer S, Tamargo M, Zhao Y, REadisic M and Vunjak-Novakovic G. A framework for developing sex-specific heart-on-a-chip models. *Nature Reviews Materials* (in press)

Other Significant Products, Whether or Not Related to the Proposed Project

1. Liu B, Wang B, Zhang X, Lock R, Nash T and Vunjak-Novakovic G. Title: Cell-type Specific MicroRNA Therapies for Myocardial Infarction. *Science Translational Medicine* Feb 10;13(580):eabd0914, 2021.
2. Hozain AE, O'Neill JD, Pinezich MR, Tipograf Y, Donocoff R, Cunningham KM, Tumen A, Fung K, Ukita R, Simpson M, Reimer JA, Ruiz EC, Queen D, Stokes JW, Cardwell NL, Talackine J, Snoeck H-W, Chen Y-W, Romanov A, Marboe CC, Griesmer AD, Guenthart BA, Bacchetta M and Vunjak-Novakovic G. Xenogeneic cross-circulation for extracorporeal recovery of injured human lungs. *Nature Medicine* 26(7):1102-1113, 2020.

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

1. Active participation in six national academies (American Academy of Arts and Sciences, National Academy of Medicine, National Academy of Engineering, National Academy of Inventors, Academia Europea, Serbian Academy of Sciences and Arts) and many honorific societies (Fellow of AAAS, Fellow of TERMIS International, Fellow of Biomedical Engineering Society, New York Academy of Sciences, Hall of Fame Women in Technology International)
2. Four companies launched from my lab: Immplacate (implacatehealth.com), Founder and Board Director; Xylyx Bio (<https://xylyxbio.com>), Founder and Chair of the Board of Directors; Tara Biosystems (<http://tarabiosystems.com>), Founder and Board Director; epiBone (epibone.com), Founder and Board Director

NSF BIOGRAPHICAL SKETCH

NAME: Wang, Yong

POSITION TITLE & INSTITUTION: Associate Professor, Department of Obstetrics and Gynecology, Department of Electrical and Systems Engineering, Department of Radiology, Biomedical Engineering, Washington University in St. Louis

(a) PROFESSIONAL PREPARATION -(see PAPPG Chapter II.C.2.f.(a))

INSTITUTION	LOCATION	MAJOR / AREA OF STUDY	DEGREE (if applicable)	YEAR YYYY
Xi'an Jiaotong University	Xi'an, Shannxi	Electrical Engineering	BS	1999
Xi'an Jiaotong University	Xi'an, Shannxi	Electrical Engineering	MS	2002
Washington University in St. Louis	St. Louis, MO	Biomedical Engineering	PHD	2009
Washington University in St. Louis	St. Louis, MO	Radiology	Postdoctoral Fellow	2009 - 2013

(b) APPOINTMENTS -(see PAPPG Chapter II.C.2.f.(b))

2020 - present Associate Professor, Department of Obstetrics and Gynecology, Department of Electrical and Systems Engineering, Department of Radiology, Biomedical Engineering, Washington University in St. Louis, St. Louis, MO

2015 - 2020 Assistant Professor, Department of Obstetrics and Gynecology, Department of Electrical and Systems Engineering, Department of Radiology, Biomedical Engineering, Washington University in St. Louis, St. Louis, MO

2013 - 2015 Instructor, Department of Radiology, Washington University in St. Louis, St. Louis, MO

2009 - 2013 Research Associate, Biomedical MR Lab, Washington University in St. Louis, St. Louis, MO

(c) PRODUCTS -(see PAPPG Chapter II.C.2.f.(c))

Products Most Closely Related to the Proposed Project

1. Wu W, Wang H, Zhao P, Talcott M, Lai S, McKinstry RC, Woodard PK, Macones GA, Schwartz AL, Cahill AG, Cuculich PS, Wang Y. Noninvasive high-resolution electromyometrial imaging of uterine contractions in a translational sheep model. *Sci Transl Med.* 2019 Mar 13;11(483) PubMed PMID: [30867320](https://pubmed.ncbi.nlm.nih.gov/30867320/).
2. Wang H, Wu W, Talcott M, McKinstry RC, Woodard PK, Macones GA, Schwartz AL, Cuculich P, Cahill AG, Wang Y. Accuracy of electromyometrial imaging of uterine contractions in clinical environment. *Comput Biol Med.* 2020 Jan;116:103543. PubMed Central PMCID: [PMC7021013](https://pubmed.ncbi.nlm.nih.gov/PMC7021013/).
3. Wang H, Wu W, Talcott M, McKinstry RC, Woodard PK, Macones GA, Schwartz AL, Cuculich P, Cahill AG, Wang Y. Electromyometrial imaging dataset of electromyograms and isochrone maps under deformation/electrical noise contaminations. *Data Brief.* 2020 Feb;28:105078. PubMed Central PMCID: [PMC6956746](https://pubmed.ncbi.nlm.nih.gov/PMC6956746/).

4. Wang H, Wang Y. Spatial-dependent regularization to solve the inverse problem in electromyometrial imaging. *Med Biol Eng Comput.* 2020 Aug;58(8):1651-1665. PubMed Central PMCID: [PMC7347447](#).

Other Significant Products, Whether or Not Related to the Proposed Project

1. Wang Y, Cuculich PS, Woodard PK, Lindsay BD, Rudy Y. Focal atrial tachycardia after pulmonary vein isolation: noninvasive mapping with electrocardiographic imaging (ECGI). *Heart Rhythm.* 2007 Aug;4(8):1081-4. PubMed Central PMCID: [PMC2078529](#).
2. Cuculich PS, Wang Y, Lindsay BD, Vijayakumar R, Rudy Y. Noninvasive real-time mapping of an incomplete pulmonary vein isolation using electrocardiographic imaging. *Heart Rhythm.* 2010 Sep;7(9):1316-7. PubMed Central PMCID: [PMC2888898](#).
3. Cuculich PS, Wang Y, Lindsay BD, Faddis MN, Schuessler RB, Damiano RJ Jr, Li L, Rudy Y. Noninvasive characterization of epicardial activation in humans with diverse atrial fibrillation patterns. *Circulation.* 2010 Oct 5;122(14):1364-72. PubMed Central PMCID: [PMC2996091](#).
4. Wang Y, Cuculich PS, Zhang J, Desouza KA, Vijayakumar R, Chen J, Faddis MN, Lindsay BD, Smith TW, Rudy Y. Noninvasive electroanatomic mapping of human ventricular arrhythmias with electrocardiographic imaging. *Sci Transl Med.* 2011 Aug 31;3(98):98ra84. PubMed Central PMCID: [PMC3182467](#).
5. Wang Y, Rudy Y. Application of the method of fundamental solutions to potential-based inverse electrocardiography. *Ann Biomed Eng.* 2006 Aug;34(8):1272-88. PubMed Central PMCID: [PMC2440514](#).

(d) SYNERGISTIC ACTIVITIES -(see PAPPG Chapter II.C.2.f.(d))

1. Curriculum Development: Developed and taught BME301 - Quantitative Physiology, and incorporated new topics including electrophysiological imaging, diffusion MR Imaging into the course.
2. Knowledge Transfer and Dissemination: Authored and coauthored 50 peer-reviewed journal papers in high profile journals, including *Science Translational Medicine*.
3. Conference organization: Served on the organizing committee of multiple international conferences including Joint International meeting on Trefftz Method and MFS.
4. Journal review: Served as journal reviewer for several scientific journals including *Science Translational Medicine*.
5. Grant Review: Served as a scientific reviewer for three agencies, including the National Institutes for Health.

NAME: Ronald J. Wapner

POSITION TITLE & INSTITUTION: Professor of OBGYN, Vice Chair of Rsch, Columbia University Med. Ctr

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Pittsburgh	Pittsburgh, PA	Chemistry	B.S.	1968
Jefferson Medical College	Pittsburgh, PA	Medicine	M.D.	1972
Jefferson Medical College	Pittsburgh, PA	OBGYN Residency		1976
Jefferson Medical College	Pittsburgh, PA	MFM Fellowship		1978
Jefferson Medical College	Pittsburgh, PA	Med Genet Fellowship		1991-1993

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2009 - Present	Vice Chair of Research and Director of Reproductive Genetics, Columbia University Medical Center, NY, NY
2005 - 2009	Director, Division of Maternal-Fetal Medicine, Columbia University Medical Center, New York, NY
2002 - 2005	Professor and Interim Chairman, Ob/Gyn, Drexel University College of Medicine, Philadelphia, PA
2000 - 2005	Director, Division of Reproductive Genetics, Drexel University College of Medicine
2000	Director, Maternal-Fetal Medicine, Drexel University College of Medicine, Philadelphia, PA
1999 - 2000	Director, Maternal-Fetal Medicine and Reproductive Genetics, Jefferson Medical College
1990 - 2000	Professor, Obstetrics and Gynecology, Jefferson Medical College
1981 - 2000	Director, Division of Maternal-Fetal Medicine, Thomas Jefferson University

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Vink J, Yu V, Dahal S, Lohner J, Stern-Asher C, Mourad M, Davis G, Xue Z, Wang S, Myers K, Kitajewski J, Chen X, Wapner RJ, Ananth CV, Sheetz M, Gallos G. Extracellular Matrix Rigidity Modulates Human Cervical Smooth Muscle Contractility-New Insights into Premature Cervical Failure and Spontaneous Preterm Birth. *Reprod Sci.* 2021 Jan;28(1):237-251. doi: 10.1007/s43032-020-00268-6. Epub 2020 Jul 22. PMID: 32700284.
2. Shi L, Yao W, Gan Y, Zhao LY, Eugene McKee W, Vink J, Wapner RJ, Hendon CP, Myers K. Anisotropic Material Characterization of Human Cervix Tissue Based on Indentation and Inverse Finite Element Analysis. *J Biomech Eng.* 2019 Sep 1;141(9):0910171–09101713. doi: 10.1115/1.4043977. PMID: 31374123; PMCID: PMC6808002.
3. Hyuga S, Danielsson J, Vink J, Fu XW, Wapner R, Gallos G. Functional comparison of anoctamin 1 antagonists on human uterine smooth muscle contractility and excitability. *J Smooth Muscle Res.* 2018;54(0):28-42. doi: 10.1540/jsmr.54.28. PMID: 29937453; PMCID: PMC6013749.
4. Westervelt AR, Fernandez M, House M, Vink J, Nhan-Chang CL, Wapner R, Myers KM. A Parameterized Ultrasound-Based Finite Element Analysis of the Mechanical Environment of Pregnancy. *J Biomech Eng.* 2017 May 1;139(5):0510041–05100411. doi: 10.1115/1.4036259. PMID: 28303276; PMCID: PMC7104753.
5. Fernandez M, House M, Jambawalikar S, Zork N, Vink J, Wapner R, Myers K. Investigating the mechanical function of the cervix during pregnancy using finite element models derived from high-resolution 3D MRI. *Comput Methods Biomech Biomed Engin.* 2016;19(4):404-17. doi: 10.1080/10255842.2015.1033163. Epub 2015 May 13. PMID: 25970655; PMCID: PMC4644115.

Other Significant Products, Whether or Not Related to the Proposed Project

1. Haque IS, Lazarin GA, Kang HP, Evans EA, Goldberg JD, Wapner RJ. Modeled Fetal Risk of Genetic Diseases Identified by Expanded Carrier Screening. *JAMA.* 2016 Aug 16;316(7):734-42.
2. Donnelly JC, Platt LD, Rebarber A, Zachary J, Grobman WA, Wapner RJ. Association of copy number variants with specific ultrasonographically detected fetal anomalies. *Obstet Gynecol.* 2014 Jul; PMID: PMC4111105.
3. D'Alton ME, Fuchs KM, Abuhammad A, Benacerraf B, Berkowitz R, Cuckle H, Depp, R, Goldberg J, O'Keefe D, Platt LD, Spitz JL, Toland G, Wapner R; Nuchal Translucency Quality Review Program. Implementation of a national nuchal translucency education and quality monitoring program. *Obstet Gynecol.* 2014Jan.

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

American Board of Obstetrics and Gynecology
Subspecialty Board, Maternal-Fetal Medicine
American Board of Medical Genetics –Clinical Genetics
Society of Maternal-Fetal Medicine Lifetime Achievement Award

NSF BIOGRAPHICAL SKETCH

NAME: West, Harry

POSITION TITLE & INSTITUTION: Professor of Practice, Columbia University

(a) PROFESSIONAL PREPARATION

INSTITUTION	LOCATION	MAJOR / AREA OF STUDY	DEGREE (if applicable)	YEAR YYYY
Cambridge University	Cambridge	Engineering	BA	1980
Massachusetts Institute of Technology	Cambridge, MA	Technology and Policy	MS	1984
Massachusetts Institute of Technology	Cambridge, MA	Robotics	PHD	1986

(b) APPOINTMENTS

2019 - present Professor of Practice, Columbia University, New York, NY
2015 - 2018 CEO, frog, San Francisco, CA
2013 - 2015 Senior Partner, Prophet, New York, NY
2009 - 2013 CEO, Continuum, Newton, MA
1994 - 2009 VP Strategy & Innovation, Continuum, Newton, MA
1992 - 1994 Associate Professor, MIT, Cambridge, MA
1986 - 1992 Assistant Professor, MIT, Cambridge, MA

(c) PRODUCTS

Products Most Closely Related to the Proposed Project

1. Ye S, Hiura G, Fleck E, Garcia A, Geleris J, Lee P, Liyanage-Don N, Moise N, Schluger N, Singer J, Sobieszczyk M, Sun Y, West H, Kronish IM. Hospital Readmissions After Implementation of a Discharge Care Program for Patients with COVID-19 Illness. J Gen Intern Med. 2021 Mar;36(3):722-729. PubMed Central PMCID: [PMC7808120](https://pubmed.ncbi.nlm.nih.gov/34888888/).

Other Significant Products, Whether or Not Related to the Proposed Project

1. West H. A Chain of Innovation. Research-Technology Management. 2014; (May-June).

(d) SYNERGISTIC ACTIVITIES

1. Design has historically been practiced as a craft. As a practitioner and as a business leader have developed processes for applying human-centered design approaches to products and translated them to services and system design.

I have used these processes to successfully identify new product and service opportunities and design, develop and launch new products and services into the market. Products and services I have designed have sold or continue to sell globally. They have been bought by millions of people who have paid billions of dollars for them. Firms I have led have developed world class reputations and been purchased by larger companies who wanted to incorporate human-centered design expertise into their organizations.

I have personally led and participated in the design and development of many products and services including: ThermaCare, Swiffer, Moen Revolution Showerhead, MasterLock Titanium series padlocks, Andersen Windows 200 series, Pampers design language, National Parks Pass, Fidelity

advertising campaigns, Tetra Pak Dream Cap, BBVA Customer Centric Bank. I have managed organizations that have designed and developed many products and services including: United HealthCare Navigate4me, Audi on Demand, Aspect Imaging Embrace, Charlie Financial.