

**CURRICULUM VITAE**  
University of Idaho

**NAME:** Bryn A. Martin

**DATE:** August 21, 2017

**RANK OR TITLE:** Assistant Professor

**DEPARTMENT:** Biological Engineering

**OFFICE LOCATION AND CAMPUS ZIP:** E/P 408, 0904

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**DATE OF FIRST EMPLOYMENT AT UI:** August 10, 2015

**DATE OF TENURE:** Untenured

**DATE OF PRESENT RANK OR TITLE:** August 10, 2015

**EDUCATION BEYOND HIGH SCHOOL:**

**Degrees:**

PhD	Mechanical Engineering, University of Illinois at Chicago	Chicago, Illinois, U.S.A.	2008
MS	Mechanical Engineering, University of Illinois at Chicago	Chicago, Illinois, U.S.A.	2005
BS	Mechanical Engineering, University of Illinois at Chicago	Chicago, Illinois, U.S.A.	2002

**Certificates and Licenses:**

Accelerated course and certification for management of tech. start-ups, EPFL, Switzerland	2009
Certified Electronics Technician training at Technology Center of DuPage, Addison, IL	1998

**EXPERIENCE:**

**Teaching, Extension and Research Appointments:**

Assistant Professor, Department of Biological Engineering, University of Idaho, ID	2015 –
Instructor (10%), University of Washington, WWAMI Regional Medical Education Program (Idaho)	2016 –
Research Assistant Professor, Department of Mechanical Engineering, University of Akron, OH	2013 – 2015
Director, Conquer Chiari Research Center, University of Akron, OH	2012 – 2015
Scientist, Swiss Federal Institute of Technology, EPFL, Lausanne, Switzerland	2011 – 2012
Postdoctoral Fellow, Swiss Federal Institute of Technology, EPFL, Lausanne, Switzerland	2009 – 2011

**Joint Faculty Appointments:**

Joint Faculty, University of Washington, Neurosurgery, WA	2016 –
Joint Faculty, National Skull Base Center, CA	2017 –
Joint Faculty, California Institute of Neuroscience, CA	2017 –
Joint Faculty, Center for Modeling Complex Interactions, University of Idaho, ID	2016 –
Joint Faculty, Mechanical Engineering, University of Idaho, ID	2015 –
Joint Faculty, Neuroscience, University of Idaho, ID	2015 –
Joint Faculty, Biology, Bioinformatics and Computational Biology, University of Idaho, ID	2015 –

**Academic Administrative Appointments:** None.

**Consulting:**

Cerebral Therapeutics, Boulder, CO: Consultant for intra-ventricular drug delivery	2017 –
Minnetronix, Minneapolis, MN: Consultant for intrathecal drug delivery	2016 –
Alcyone Lifesciences, Concord, MA: Consultant for medical device	2016 –
Voyager Therapeutics, Cambridge, MA: Consultant for MRI assessment of intrathecal drug delivery	2014 – 2015
Medtrac Biosystems, Palo Alto, CA: Design consultant for anthropomorphic bioreactor	2011
Neurosyntec, Los Gatos, CA: Neurohydrodynamics consultant for funded NSF SBIR grant	2010 – 2011

**Non-Academic Employment including Armed Forces:**

Baxter Healthcare, Biosurgery, Round Lake, IL: Industrial Project Research Assistant	2007
Motorola, Biomonitoring Group, Schaumburg, IL: Industrial Project Research Assistant	2005 – 2006
Hospira, New Product Technologies Group, Lake Forest, IL: Internship	2007
Baxter, Global R&D, Round Lake, IL: Internship	2005
Motorola, Civil Government Industrial Sector, Schaumburg, IL: Internship	2004
Sencon Sensors and Controllers, Bedford Park, IL: Design Engineer Internship	2002
Sencon Sensors and Controllers, Bedford Park, IL: Electronics Technician	2001

**TEACHING ACCOMPLISHMENTS:****Areas of Specialization:**

Cerebrospinal fluid dynamics, Biofluid Mechanics, Biomechanics, Biomedical Imaging, Instrumentation and Measurements, Neural Engineering.

**Courses Taught:***University Courses Taught (% contribution)*

BE 441	<i>Instrumentation and Measurements</i> , Enrollment = 15, University of Idaho (50%)	2017 F
BE 404/504	<i>Medical Imaging Techniques and Applications</i> , Enrollment = 4, University of Idaho (100%)	2017 S
ISEM 301	<i>Tech Startup Entrepreneurship</i> , Enrollment = 26, University of Idaho (80%)	2017 S
BE 404/504	<i>Neural Engineering</i> , Enrollment = 4, University of Idaho (100%)	2016 F
BE 404/504	<i>Medical Imaging Techniques and Applications</i> , Enrollment = 7, University of Idaho (100%)	2016 S

*WWAMI Teaching (10% FTE)*

WWAMI	<i>Basic imaging of the chest, radiographs and CT</i> , Univ. of Washington Medical School	2017 F
WWAMI	<i>Basic imaging of the chest, radiographs and CT</i> , Univ. of Washington Medical School	2017 S
WWAMI	<i>Pulmonary chest radiograph interpretation</i> , Univ. of Washington Medical School	2017 S
WWAMI	<i>Ultrasound Imaging Physics and Applications</i> , Univ. of Washington Medical School	2016 S
WWAMI	<i>Ultrasound Imaging Spring Break Training Module</i> , Univ. Washington Medical School	2016 S
WWAMI	<i>Human Form and Function Module - Imaging</i> , Univ. of Washington Medical School	2016 F
WWAMI	<i>Breast Cancer Imaging</i> , Univ. of Washington Medical School	2016 F

*Engineering Design Capstone Project Mentorship*

BE 479	<i>Engineering Design</i> , Project Sponsor “Neurotouch”, University of Idaho, Moscow, ID	2017 S
BE 479	<i>Engineering Design</i> , Project Sponsor “Biological Pump”, University of Idaho, Moscow, ID	2017 F
BE 479	<i>Engineering Design</i> , Project Sponsor “CSF system”, University of Idaho, Moscow, ID	2016 SF

*Virtual Technology & Design Capstone Project Mentorship*

VTD 457	<i>Capstone Design Studio I</i> , Project Sponsor “Neuroculus”, University of Idaho, Moscow, ID	2017 F
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*University Undergraduate Research Courses Taught (100%)*

BE 499	<i>Neuroengineering Research</i> , Enrollment = 2, University of Idaho, Moscow, ID	2017 F
BE 499	<i>Neuroengineering Research</i> , Enrollment = 2, University of Idaho, Moscow, ID	2017 S
BE 499	<i>Neuroengineering Research</i> , Enrollment = 2, University of Idaho, Moscow, ID	2016 F
BE 499	<i>Neuroengineering Research</i> , Enrollment = 1, University of Idaho, Moscow, ID	2016 S
BIOL 401	<i>Undergraduate Student Research</i> , Enrollment = 1, University of Idaho, Moscow, ID	2015 F

*Course Interactive Learning Field Trips Organized*

INBRE	<i>Onboarding tour</i> , IRIC Neurophysiological Imaging and Modeling Laboratory	2017 S
ISEM 101	<i>Lab tour</i> , IRIC Neurophysiological Imaging and Modeling Laboratory	2017 S
BE 404/504	<i>Integrated Sports Medicine and Rehabilitative Therapy Clinic</i> , Moscow, ID	2017 S
BE 404/504	<i>MR imaging facility tour</i> , Gritman Medical Center, Moscow, ID	2017 S
BE 404/504	<i>MR imaging facility tour</i> , Gritman Medical Center, Moscow, ID	2016 S
BE 404/504	<i>Neurorehabilitation tour</i> , St. Luke’s Rehabilitation Institute tour, Spokane, WA	2016 F

*Continuing Medical Education (CME) accredited teaching lectures*

Accredited by the Accreditation Council for Continuing Medical Education (ACCME)

1. "Engineering-based Methods for Static and Dynamic Assessment of Chiari malformation" XXIX ASAP Conference on Chiari I Malformation, Syringomyelia, and Related Disorders (Uniondale, NY, 6/20-23, 2017).
2. "Cerebellar and Brain Stem Deformation Assessment of Chiari Malformation" American Society of Neuroradiology (Washington D.C., U.S.A., 5/27/2016).
3. "Neurophysiological Imaging and Modeling in Health and Disease" University of Washington, Department of Neurosurgery (Seattle, WA, 12/2/2015).
4. "Cerebrospinal fluid dynamics in the spinal subarachnoid space," Neuroscience Forum, European Continuing Medical Training (Lausanne, Switzerland, 02/7-8, 2014).
5. "Coupled neurohydrodynamic modeling of the cardiovascular and cerebrospinal fluid system: insights gained and challenges that remain," European continuing medical training Neuroscience Forum, (Domaine de Divonne, Divonne-les-Bains, France, 12/16-17, 2011).

**Students Advised:***Undergraduate Students*

2017	advised to completion of degree = 0
2016	advised to completion of degree = 0
2015	advised to completion of degree = 0

*Current student advisees*

8	Undergraduate
2	PhD
1	MS

*Current Doctoral Candidates*

Ph.D.	M. Khani	University of Idaho, Biological Engineering	Spring 2016 – Present	Major Professor
Ph.D.	L. Sass	University of Idaho, Biological Engineering	Fall 2016 – Present	Major Professor
Ph.D.	S. Pahlavian	University of Akron, Mech. Engineering	Fall 2013 – Present	Committee Member

*Current Master's Candidates*

M.S.	J. Rohr	University of Idaho, Biological Engineering	Fall 2016 – Present	Major Professor
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*Current Undergraduate Trainees*

B.S.	K. McCain	University of Idaho, Computer Science	Summer 2017 – Present	Research Supervisor
B.S.	A. Sass	University of Idaho, Computer Science	Fall 2015 – Present	Research Supervisor
B.S.	S. Sater	University of Idaho, Biological Engineering	Spring 2017 – Present	Research Supervisor
B.S.	C. Majors	University of Idaho, Mechanical Engineering	Spring 2017 – Present	Research Supervisor
B.S.	B. Aldrimk	University of Idaho, Mechanical Engineering	Spring 2017 – Present	Research Supervisor
B.S.	L. Hold	University of Idaho, Biological Engineering	Spring 2017 – Present	Research Supervisor
B.A.	J. Oles	University of Idaho, Virtual Tech. & Design	Spring 2017 – Present	Research Co-supervisor

*Engineering Grand Challenge Scholar Trainees*

B.S.	T. Freeman	University of Idaho, Computer Science	Fall 2015 – Present	Grand Scholar Mentor
B.S.	G. Conley	University of Idaho, Biological Engineering	Fall 2015 – Present	Grand Scholar Mentor

*Current Medical School Trainees*

N/A	B. Lawrence	University of Washington, Medical Program	Fall 2016 – Present	MSRTP Mentor
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*Completed Doctoral Students*

Ph.D.	S. Thyagaraj	University of Akron	Spring 2016	Co-Supervisor / Committee
				• Dissertation: "In Vitro Investigation of CSF Dynamics in Chiari Malformation by 4D MRI"
				• Current Position: Post-doctoral fellow, Case Western Reserve
Ph.D.	S. Ashaat	Auckland U. of Tech.	Fall 2012 – 2015	Committee Member
				• Dissertation: "Understanding upper airway dynamic characteristics in OSA patients under treatment"
				• Current Position: Lecturer in Refrigeration and Air Conditioning at Manukau Institute of Technology
Ph.D.	N. Shaffer	The University of Akron	Fall 2015	Co-Supervisor / Committee
				• Dissertation: "MRI-Based Computational Modeling of CSF Dynamics in Chiari Malformation"

- Current Position: Quality Control Engineer, Cleveland, Ohio.
- Ph.D. T. Yiallourou EPFL, Switzerland Fall 2012 – 2014 Co-Director / Committee
- Dissertation: “Subject-Specific CFD modeling and measurement of CSF motion in the cervical spine”
- Current Position: Omeros Corporation, Senior Scientist, Seattle, Washington.
- Ph.D. K. Shahim EPFL, Switzerland Fall 2009 – 2011 Co-Supervisor / Committee
- Dissertation: “Bio Simulation of Brain Ventricle Dilation in Normal Pressure Hydrocephalus”
- Current Position: Postdoctoral Fellow, Inst. for Surgical Technology and Biomechanics, U. of Bern

*Completed Master’s Students*

- M.S. S. Mei University of Idaho 6/2016 – 12/2016 Major Professor / Research Supervisor
- Thesis: N/A, transferred to another advisor.
- M.S. S. Pahlavian University of Tehran Spring 2012 – 2013 Research Co-Supervisor
- Thesis: “Numerical simulation of spinal cord nerve roots impacts on cervical CSF”
- Current Position: Ph.D. student at the University of Akron
- M.S. B. Anthikat KTH Royal Inst. of Tech. Fall 2011 Thesis Co-Supervisor
- Thesis: “Continuous Positive Airway Pressure Impacts Cerebral Blood Flow and CSF Motion”
- M.S. E. Coppens EPFL Fall 2010 Thesis Co-Supervisor
- Thesis: “Assessment of the Impact of Placing An Aortic Graft Upon the Hemodynamics”
- Current Position: Ph.D. student at Katholieke Universiteit Leuven, KLIP
- M.S. A. Picquot Institut Supérieur de Mécanique Fall 2010 Thesis Co-Supervisor
- Thesis: “An in vivo MRI and CFD simulation of CSF hydrodynamics in the third ventricle”
- Current Position: Production and Maintenance Managers Assistant at Holcim
- M.S. E. Farine EPFL, Switzerland Spring 2012 4-month Project Supervisor
- Thesis Project Report: “Measurement of Brain Volume Change Due to Acute Modification of ICP”
- Current Position: Ph.D. student at Swiss Federal Institute of Technology
- M.S. A. Chiki EPFL, Switzerland Spring 2012 4-month Project Supervisor
- Thesis Project Report: “Lumbar spine cerebrospinal fluid velocity measurements in tethered cord”
- M.S. A. Hirsch EPFL, Switzerland Fall 2011 4-month Project Supervisor
- Thesis Project Report: “Construction of a 3D Model of the Spinal Subarachnoid Space”
- Current Position: Ph.D. student at Swiss Federal Institute of Technology
- M.S. L. Asboth EPFL, Switzerland Spring 2011 4-month Project Supervisor
- Thesis Project Report: “Comparison of 4D MRI flow measurements and 3D CFD simulation of CSF”
- Current Position: Ph.D. student at Swiss Federal Institute of Technology
- M.S. C. Meuli EPFL, Switzerland Spring 2011 4-month Project Supervisor
- Thesis Project Report: “Pulse Wave Velocity in the Spinal Subarachnoid Space”
- Current Position: Ph.D. student at Swiss Federal Institute of Technology

*Completed Undergraduate Research Students*

- B.S. J. Fluid University of Idaho Fall 2015 – Summer 2016 Research Supervisor
- B.S. C. Gibbs University of Idaho Fall 2015 – Summer 2016 Research Supervisor
- B.S. M. Vinicius University of Idaho Fall 2015 – Spring 2016 Research Supervisor
- B.S. A. Elliott University of Idaho Fall 2015 – Summer 2016 Research Supervisor
- B.S. V. Gomm University of Idaho Summer 2016 Research Supervisor
- B.S. M. V da Silva University of Idaho Fall 2015 – Spring 2016 Research Supervisor
- B.S. J. Havrilak The University of Akron Fall 2014 – Spring 2015 Senior Design Supervisor
- B.S. V. Traviso The University of Akron Summer 2014 Research Supervisor
- B.S. M. Dailey The University of Akron Fall 2014 – Spring 2015 Senior Design Supervisor
- B.S. D. Lemmer The University of Akron Summer 2014 Senior Design Supervisor
- B.S. L. Kostan The University of Akron Summer 2014 Research Supervisor
- B.S. J. Schlafer Brown University Summer 2014 Research Supervisor
- B.S. V. Traviso The University of Akron Summer 2014 Research Supervisor
- B.S. G. Margida Grinnell College Summer 2014 Research Supervisor
- B.S. R. Kenyon The University of Akron Spring 2013 Research Supervisor
- B.S. M. Wransky The University of Akron Fall 2013 – Spring 2014 Research Co-Supervisor
- B.S. D. McQuaide Iowa State University Fall 2013 – Summer 2014 Research Supervisor
- B.S. I. Pitteloud EPFL Spring 2013 Research Supervisor
- B.S. M. Majcher The University of Akron Fall 2012 – Spring 2013 Research Supervisor
- B.S. R. Kenyon The University of Akron Spring 2013 Research Supervisor
- B.S. J. Chishko The University of Akron Fall 2012 Research Supervisor
- B.S. J. Lazzara The University of Akron Fall 2012 Research Supervisor

B.S.	S. Metrailler	EPFL	Spring 2011	Research Supervisor
B.S.	A. DeMuralt	EPFL	Spring 2010	Research Supervisor
B.S.	G. Muller	EPFL	Spring 2010	Research Supervisor

*Completed Medical Student Trainees*

B.S.	P. MartyNE	Ohio Medical Univ.	Summer 2014	Research Supervisor
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*Completed High School Student Trainees*

H.S.	K. McCain	University of Idaho	Summer 2017	Summer Research Supervisor
H.S.	N. Allen	The University of Akron	Summer 2014	Summer Research Supervisor
H.S.	D. McQuaide	The University of Akron	Summer 2013	Summer Research Supervisor
H.S.	M.Lowenkamp	The University of Akron	Summer 2013	Summer Research Supervisor
H.S.	J. Loth	The University of Akron	Summer 2013	Summer Research Supervisor

**Materials Developed:** (non-scholarship activity)

BBLearn Online Lecture Notes and Videos (21 lectures) for Medical Imaging Techniques and Applications	2016
BBLearn Online Lecture Notes and Videos (21 lectures) for Neural Engineering	2016

**Courses Developed:**

ISEM 301	<i>Tech Startup Entrepreneurship</i> , University of Idaho, Moscow, ID	2017 S
BE 404/504	<i>Neural Engineering</i> , University of Idaho, Moscow, ID	2016 F
BE 404/504	<i>Medical Imaging Techniques and Applications</i> , University of Idaho, Moscow, ID	2016 S

**Non-credit Classes, Workshops, Seminars, Invited Lectures, etc.:**

BE 142	<i>Course lecture</i> , Engineering for Living Systems, University of Idaho, Moscow, ID	2016 F
BE 142	<i>Course lecture</i> , Engineering for Living Systems, University of Idaho, Moscow, ID	2015 F
ISEM 101	<i>Course lecture</i> , Engineering Grand Challenges, University of Idaho, Moscow, ID	2017 S

**Honors and Awards:**

Appointed Joint Faculty, Neurosurgery, University of Washington, WA	2016 –
Appointed Joint Faculty, California Institute of Neuroscience, CA	2017 –
Appointed Joint Faculty, National Skull Base Center, CA	2017 –

**SCHOLARSHIP ACCOMPLISHMENTS:****Publication summary**

- 34 peer-reviewed full-length journal publications
- 6 peer-reviewed publications presently under review
- Corresponding author (denoted with **Martin BA\***) for 16 peer-reviewed full-length journal publications.
- Three review papers in cerebrospinal fluid dynamics
- Scopus: 305 citations by 161 documents with h-index = 11, as of 7/31/2017, ID: 8683613700
- 51 peer-reviewed documents indexed in Scopus: <http://www.scopus.com/authid/detail.url?authorId=8683613700>

**Peer reviewed full-length journal publications**

1. Houston JR, Loth DM, Allen PA, Eppelheimer MS, Pahlavian SH, Braun A, Biswas D, **Martin BA**, Urbizu A, Labuda R, Bapuraj R, Luciano MG, Elias JJ, Loth F, "Morphometric assessment of type 1 Chiari malformation above the McRae line: a retrospective case-control study in 302 adult female subjects." *Journal of Neuroradiology* (Accepted).
2. Khani M, Xing T, Gibbs C, Oshinski J, Stewart GR, Zeller JR, **Martin BA\*** (2017), "Non-uniform Moving Boundary Method for Simulation of Intrathecal Cerebrospinal Fluid Dynamics in a Cynomolgus Monkey." *Journal of Biomechanical Engineering*, Published.
3. Urbizu A, **Martin BA**, Moncho D, Rovira A, Poca MA, Sahuquillo J, Macaya A, Espanol MI (2017) "Machine learning applied to neuroimaging identifies the basion as a key morphometric indicator of adult classic Chiari malformation." *J Neurosurg*, Published.
4. Haga PT, Pizzichelli G, Mortensen M, Kuchta M, Heidari Pahlavian S, Sinibaldi E, Mardal, K., **Martin BA\*** (2017), "A numerical investigation of intrathecal drug and gene vector dispersion within the cervical subarachnoid space." *PlosONE*, Published.
5. Yildiz S, Thyagaraj S, Ning J, Xiaodong Z, Heidari-Pahlavian S, **Martin BA**, Loth F, Sabra K, Oshinski JN (2017), "Quantifying the Influence of Respiration and Cardiac Pulsations on the Cerebrospinal Fluid Dynamics Using Real-Time Phase-Contrast MRI." *Journal of Magnetic Resonance Imaging*, Published.
6. Urbizu A, Ferre A, Poca MA, Rovira A, Sahuquillo J, **Martin BA**, Macaya A (2016), "Cephalometric oropharynx and oral cavity analysis in Chiari malformation Type I: a retrospective case-control study." *J Neurosurg*: 1-8.
7. Alves T, Ibrahim E, **Martin BA**, Malyarenko D, Maher C, Muraszko K, Garton HJ, Srinivasan A, Bapuraj RJ (2016), "Principles, Techniques, and Clinical Applications of Phase Contrast Magnetic Resonance Cerebrospinal Fluid Imaging." *Neurographics*, Published.
8. Pahlavian SH, Bunck AC, Thyagaraj S, Giese D, Loth F, Hedderich DM, Kroeger JR, **Martin BA\*** (2016), "Accuracy of 4D Flow measurement of cerebrospinal fluid dynamics in the cervical spine: An in vitro verification against numerical simulation." *Ann Biomed Eng*, In Press.
9. Bapuraj RJ, Lony FJ, N. D, C.O. M, **Martin BA**, Muraszko K, J. QD (2016), "Cerebrospinal fluid velocity amplitudes within the aqueduct of Sylvius in pediatric healthy subjects and patients with Chiari I malformation." *Journal of Magnetic Resonance Imaging*, In Press.
10. **Martin BA\***, Yiallourou TI, Pahlavian SH, Loth F, Bunck AC, Shaffer N, Kroeger JR, Stergiopoulos N (2015), "Inter-Operator Dependence of Magnetic Resonance Image-Based Computational Fluid Dynamics Prediction of Cerebrospinal Fluid Motion in the Cervical Spine." *Annals of Biomedical Engineering*, Published.
11. Pahlavian SH, Loth F, Oshinski JN, Luciano MG, **Martin BA\*** (2015), "Cardiac related neural tissue motion impacts cerebrospinal fluid dynamics at the cervical-medullary junction: a patient-specific moving-boundary computational fluid dynamics model of type 1 Chiari malformation." *Annals of Biomedical Engineering*.
12. Yiallourou T, Schmid Daners M, Kurtcuoglu V, Haba-Rubio J, Heinzer R, Fornari E, Santini F, Sheffer DB, Stergiopoulos N, **Martin BA\*** (2015), "Continuous positive airway pressure alters cranial blood flow and cerebrospinal fluid dynamics at the craniovertebral junction." *Interdisciplinary Neurosurgery*, 2: 152-159.
13. Pahlavian SH, Bunck AC, Loth F, Tubbs RS, Yiallourou T, Kroeger JR, Heindel W, **Martin BA\*** (2015), "Characterization of the Discrepancies between Four-Dimensional Phase-Contrast Magnetic Resonance Imaging and In-Silico Simulations of Cerebrospinal Fluid Dynamics." *Journal of Biomechanical Engineering-Transactions of the Asme*, In Press.
14. Luciano MG, **Martin BA**, Allen P, Loth F (2015), "The squeeze of Chiari malformation, clinicians and scientists collaborate to understand its cause and effects." *Pediatric Neuroscience Pathways*.
15. Heidari Pahlavian S, Yiallourou T, Tubbs RS, Bunck AC, Loth F, Goodin M, Raisee M, **Martin BA\*** (2014), "The impact of spinal cord nerve roots and denticulate ligaments on cerebrospinal fluid dynamics in the cervical spine." *PLoS One*, 9: e91888.
16. Allen PA, Houston JR, Pollock JW, Buzzelli C, Li X, Harrington AK, **Martin BA**, Loth F, Lien MC, Maleki J, Luciano MG (2014), "Task-specific and general cognitive effects in Chiari malformation type I." *PLoS One*, 9: e94844.
17. Yiallourou TI, Odier C, Heinzer R, Hirt L, **Martin BA**, Stergiopoulos N, Haba-Rubio J (2013), "The effect of continuous positive airway pressure on total cerebral blood flow in healthy awake volunteers." *Sleep and Breathing*, 17: 289-296.

18. Shaffer N, **Martin BA**, Rocque B, Madura C, Wieben O, Iskandar B, Dombrowski S, Luciano M, Oshinski J, Loth F (2013), "Cerebrospinal Fluid Flow Impedance is Elevated in Type I Chiari Malformation." *J Biomech Eng*.
19. **Martin BA\***, Kutluay U, Yazicioglu Y (2013), "Method for Dynamic Material Property Characterization of Soft-Tissue-Mimicking Isotropic Viscoelastic Materials Using Fractional Damping Models." *Journal of Testing and Evaluation*, 41: 804-812.
20. **Martin BA\***, Kalata W, Shaffer N, Fischer P, Luciano M, Loth F (2013), "Hydrodynamic and longitudinal impedance analysis of cerebrospinal fluid dynamics at the craniovertebral junction in type I Chiari malformation." *PLoS One*, 8: e75335.
21. **Martin BA\***, Allen PA (2013), "Where do we stand on the relationship between tau biomarkers and mild cognitive impairment?" *Quantitative Imaging in Medicine and Surgery*, 3: 189-191.
22. Elliott NSJ, Bertram CD, **Martin BA**, Brodbelt AR (2013), "Syringomyelia: A review of the biomechanics." *Journal of Fluids and Structures*, 40: 1-24.
23. Bunck AC, Kroeger JR, Juettner A, Brentrup A, Fiedler B, Crelier GR, **Martin BA**, Heindel W, Maintz D, Schwindt W, Niederstadt T (2012), "Magnetic resonance 4D flow analysis of cerebrospinal fluid dynamics in Chiari I malformation with and without syringomyelia." *Eur Radiol*, 22: 1860-1870.
24. **Martin BA\***, Reymond P, Novy J, Baledent O, Stergiopoulos N (2012), "A coupled hydrodynamic model of the cardiovascular and cerebrospinal fluid system." *Am J Physiol Heart Circ Physiol*, 302: H1492-1509.
25. Shahim K, Drezet JM, **Martin BA**, Momjian S (2012), "Ventricle equilibrium position in healthy and normal pressure hydrocephalus brains using an analytical model." *J Biomech Eng*, 134: 041007.
26. Vardoulis O, Coppens E, **Martin BA**, Reymond P, Tozzi P, Stergiopoulos N (2012), "Response to comments regarding Vardoulis O, et al., Impact of Aortic Grafts on Arterial Pressure: A Computational Fluid Dynamics Study. *Eur J Vasc Endovasc Surg* 2011;42:704-10." *European Journal of Vascular and Endovascular Surgery*, 43: 238-239.
27. Yiallourou TI, Kroger JR, Stergiopoulos N, Maintz D, Bunck AC, **Martin BA\*** (2012), "Comparison of 4D phase-contrast MRI flow measurements to computational fluid dynamics simulations of cerebrospinal fluid motion in the cervical spine." *PLoS One*, 7: e52284.
28. Shaffer N, **Martin BA**, Loth F (2011), "Cerebrospinal fluid hydrodynamics in type I Chiari malformation." *Neurol Res*, 33: 247-260.
29. Vardoulis O, Coppens E, **Martin BA**, Reymond P, Tozzi P, Stergiopoulos N (2011), "Impact of Aortic Grafts on Arterial Pressure: A Computational Fluid Dynamics Study." *European Journal of Vascular and Endovascular Surgery*, 42: 704-710.
30. **Martin BA\***, Labuda R, Royston TJ, Oshinski JN, Iskandar B, Loth F (2010), "Spinal Subarachnoid Space Pressure Measurements in an In Vitro Spinal Stenosis Model: Implications on Syringomyelia Theories." *Journal of Biomechanical Engineering-Transactions of the Asme*, 132.
31. Kalata W, **Martin BA**, Oshinski JN, Jerosch-Herold M, Royston TJ, Loth F (2009), "MR Measurement of Cerebrospinal Fluid Velocity Wave Speed in the Spinal Canal." *IEEE Trans Biomed Eng*.
32. **Martin BA\***, Loth F (2009), "The influence of coughing on cerebrospinal fluid pressure in an in vitro syringomyelia model with spinal subarachnoid space stenosis." *Cerebrospinal fluid research*, 6: 17.
33. Yazicioglu Y, Royston TJ, Spohnholtz T, **Martin BA**, Loth F, Bassiouny HS (2005), "Acoustic radiation from a fluid-filled, subsurface vascular tube with internal turbulent flow due to a constriction." *Journal of the Acoustical Society of America*, 118: 1193-1209.
34. **Martin BA\***, Kalata W, Loth F, Royston TJ, Oshinski JN (2005), "Syringomyelia hydrodynamics: An in vitro study based on in vivo measurements." *Journal of Biomechanical Engineering-Transactions of the Asme*, 127: 1110-1120.

**Publications under review** (full text provided upon request)

1. Lawrence BJ, Luciano MG, Tew J, Ellenbogen RG, Oshinski JN, Loth F, Culley AP, **Martin BA\***, "Cardiac-related spinal cord tissue motion at the foramen magnum is elevated in Type I Chiari malformation patients and decreases post-decompression surgery." (Under Review).
2. Luciano MG, Batzdorf U, Kula RW, Rocque BG, Maher CO, Heiss J, **Martin BA**, Bolognese P, Ashley-Koch A, Limbrick D, Poppe DJ, Esposito KM, Odenkirchen J, Conwit R, McNeil E, Nuckolls G, Rubinstein Y, Ury TK, Ala'i S, Feldman R, "Development of common data elements for use in Chiari Malformation Type I clinical research: a National Institute for Neurological Disorders and Stroke project." (Under Review).
3. Khalsa SS, Geh N, **Martin BA**, Allen P, Strahle J, Loth F, Habtzghi D, Serrano AU, McQuaide D, Garton H, Dr. Muraszko K, Maher C, "Morphometric and volumetric comparison of 102 children with symptomatic and asymptomatic Chiari malformation type I." (Under Review).
4. Sharp MK, Carare R, **Martin BA**, "Dispersion in porous media in oscillatory flow between flat plates: Applications to intrathecal and perivascular solute transport in the central nervous system." (Under Review).
5. Thyagaraj S, Pahlavian SH, Loth F, Vatani M, Choi J, Tubbs RS, Giese D, Kroger J, Bunck AC, **Martin BA\***, "An MRI-Compatible Hydrodynamic Simulator of Cerebrospinal Fluid Motion in the Cervical Spine." (Under Review).
6. Ashaat SA, Al-Jumaily A, **Martin BA**, Pohle-Krauzza R, Krauzza ML, "Biomechanical Assessment of Obstructive Sleep Apnea Pre and Post Bariatric Surgery." (Under Review).

7. Pizzichelli G, Kehlet B, Evju Ø, **Martin BA**, Rognes ME, Mardal KA, Sinibaldi E, “Numerical study of intrathecal drug delivery to a permeable spinal cord: effect of catheter position and angle.” (Under Review).

***Peer-reviewed extended conference proceedings (greater than 2 pages)***

1. Loth F, Pahlavian SH, Amini R, Shaffer N, **Martin BA**, Zhong X, Oshinski J, “Computational Tools to Assess Impedance, Pressure and Strain for Subjects With Chiari Malformation,” 5<sup>th</sup> International Conference on Computational and Mathematical Biomedical Engineering – CMBE2017 (Pittsburgh, PA, USA, 4/10-12, 2017)
2. **Martin BA\***, Yiallourou TI, Stergiopoulos N, “Quantitative comparison of 4D MRI flow measurements to 3D CFD simulation of cerebrospinal fluid movement in the spinal subarachnoid space,” International Conference on Computational Fluid Dynamics in Medicine and Biology (Dead Sea, Israel, 03/25-30, 2012).
3. Yiallourou TI, Asboth L, Kroeger JR, Maintz D, Bunck AC, **Martin BA**, Stergiopoulos N, “Quantitative comparison of 4D MRI flow measurements to 3D CFD simulation of cerebrospinal fluid movement in the spinal subarachnoid space,” 10<sup>th</sup> International Workshop on Biomedical Engineering (Kos, Greece, 10/5-7, 2011).
4. Yazicioglu Y, **Martin BA**, Navarro K, Royston TJ, “Transverse vibration of pre-stressed beams: An experimental technique for the determination of dynamic viscoelastic material properties of tissue mimicking materials,” 152<sup>nd</sup> Meeting of the Acoustical Society of America (Paris, France, 5/29-6/4, 2008).

***Keynote and grand rounds lectures***

1. “Neurophysiological Imaging and Modeling in Health and Disease” University of Washington, Department of Neurosurgery, Grand Rounds (Seattle, WA, 12/2/2015).
2. “Characterization and modeling of Chiari malformation,” National Institutes of Health (NIH), National Institutes of Neurological Disorders and Stroke, Grand Rounds (Bethesda, MD, 11/13, 2014).
3. “Progress in Chiari malformation research at the University of Akron,” Akron General Hospital Post-grad Research Symposium (Akron, OH, 06/06, 2013).
4. “Syringomyelia biomechanics,” NIH – National Institute of Neurological Disorders and Stroke, Grand Rounds (Bethesda, Maryland, 2/5, 2008).

***Invited lectures (\*published as conference abstracts)***

1. “Quantitative MRI-based Diagnostics for Chiari Malformation” Chiari and Syringomyelia Foundation, Think Tank (San Diego, CA, TBD).
2. “Convection Enhanced Rational Intrathecal Delivery Based on CSF Dynamics” Biogen (Boston, MA, 8/14, 2017).
3. “Numerical modeling of intrathecal cerebrospinal fluid dynamics” Idaho NIH IDeA INBRE Conference (Moscow, ID, 8/2, 2017).
4. “Biophysics of Chiari malformation” 13<sup>th</sup> Symposium of the International Hydrocephalus Imaging Working Group (Kobe, Japan, 9/25-26, 2017).
5. “MRI-based quantification of CSF dynamics in ALS patients: a prospective case-control study” Inland Northwest Movement Disorder Society, 3<sup>rd</sup> Annual Meeting (Spokane, WA, 9/7-8, 2017).
6. “Engineering-based Methods for Static and Dynamic Assessment of Chiari malformation” American Syringomyelia and Chiari Alliance Project Annual Conference (Long Island, NY, 7/20-23, 2017)\*.
7. “Are monkeys like humans? Comparison of intrathecal CSF dynamics across mammalian species” International Cerebrospinal Fluid Dynamics Society (Atlanta, Georgia, 6/19-20/2017)\*.
8. “MRI Assessment of CSF Dynamics and Geometry in Non-human Primates” International Society for Hydrocephalus and Cerebrospinal Fluid Disorders (ISHCSF) (Cartagena, Colombia, 10/10/2016)\*.
9. “Cerebellar and Brain Stem Deformation Assessment of Chiari Malformation” American Society of Neuroradiology (Washington D.C., U.S.A., 5/27/2016)\*.
10. “Measurement and Modeling of Intracranial Fluid Dynamics and Morphology” Washington State University (Spokane, WA, 01/11/2016).
11. “Reliability of 4D Phase Contrast MRI for detection of CSF flow velocities” IHIWG / ISHCSFD Conference (Banff, Canada, 9/18, 2015).
12. “How reliable is phase-contrast MRI detection of CSF flow in Chiari malformation?” American Syringomyelia and Chiari Alliance Project Annual Conference (Ann Arbor, MI, 7/22-25, 2015).
13. “Assessment of cephalometric measurement reliability in type 1 Chiari malformation,” American Society of Neuroradiology, CSF flow study group (Chicago, IL, 5/1, 2015).
14. “Characterization and modeling of cerebrospinal fluid dynamics in health and disease,” Medtronic Neuro Forum Internal Lecture (Minneapolis, MN, 3/6, 2015).
15. “Reliability of CSF flow detection in Chiari malformation: an in vitro assessment of 4D phase-contrast MRI,” American Syringomyelia and Chiari Alliance Project (ASAP) Annual Meeting, University of Michigan (Ann Arbor, MI, 7/22-25, 2015).
16. “Biomechanical characterization of Chiari malformation: morphometrics, CSF dynamics, and neuromechanics,” Conquer Chiari Research Conference (Akron, OH, 11/8-9, 2014).



17. "In vitro comparison of 4D and 2D PC MRI assessment of CSF dynamics," International Hydrocephalus Imaging Working Group (IHIWG) (Bristol, UK, 9/5-6, 2014).
18. "Measurement and modeling of cerebrospinal fluid dynamics in health and disease," Voyager Therapeutics (Cambridge, MA, 7/9, 2014).
19. "Characterization and modeling of cerebrospinal fluid dynamics in Chiari Malformation," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014)\*.
20. "Cerebrospinal fluid dynamics in the spinal subarachnoid space," Neuroscience Forum, European Continuing Medical Training (Lausanne, Switzerland, 02/7-8, 2014).
21. "Characterization and modeling of cerebrospinal fluid dynamics: a field rich in complexity with many questions to answer," 7<sup>th</sup> World Congress on Biomechanics (Boston, Ma, U.S.A., 07/6-11, 2014)\*.
22. "Spinal cord nerve roots and denticulate ligaments alter CSF dynamics in the upper cervical spine," 2<sup>nd</sup> International CSF dynamics symposium (Manhasset, New York, U.S.A., 06/24-25, 2013)\*.
23. "Engineering insights into CSF flow dynamics at the craniovertebral junction," 51<sup>st</sup> Annual Meeting and The Foundation of the American Society of Neuroradiology Symposium, Hydrocephalus and CSF flow group meeting (San Diego, CA, 05/18-23, 2013).
24. "The importance of cerebrospinal fluid dynamics in craniospinal disorders," University of Illinois at Chicago, Department of Biomedical Engineering Lecture Series (Chicago, IL, 05/03, 2013).
25. "Chiari what? Using engineering principles to help understand biomechanics of a rare brain disorder called Chiari malformation," University of Akron, Research for Lunch Lecture Series (Akron, Ohio, 03/13, 2013).
26. "4D MRI applied to the investigation of Chiari & syringomyelia," Conquer Chiari Research Conference (Chicago, IL, 11/8-9, 2012).
27. "Neurohydrodynamics in the cervical spine," American Syringomyelia and Chiari Alliance Project Research Conference, Children's National Medical Center (Washington D.C., 07/18-21, 2012).
28. "4D MRI quantification of CSF velocities with comparison to computational fluid dynamics simulations," American Society of Neuroradiology 50<sup>th</sup> Annual Meeting, CSF and Hydrocephalus Study Group (New York, 04/26-27, 2012).
29. "Research trends in neurohydrodynamics," Nagoya Institute of Technology symposium on bioengineering, (Nagoya, Japan, 03/08, 2012).
30. "Coupled neurohydrodynamic modeling of the cardiovascular and cerebrospinal fluid system: insights gained and challenges that remain," European continuing medical training Neuroscience Forum, (Domaine de Divonne, Divonne-les-Bains, France, 12/16-17, 2011).
31. "Neurohydrodynamics: an engineering perspective," Department of Neuroradiology at the University Hospital of Münster, (Münster, Germany, 8/25, 2011).
32. "Simulation of CSF in the spinal subarachnoid space and spinal cord blood flow," 1<sup>st</sup> International Cerebrospinal Fluid Engineering Conference, (Zurich, Switzerland, 7/22-25, 2011)\*.
33. "In vitro modeling of syrinx progression," Conquer Chiari Research Conference: New Developments and Controversies (Chicago, IL, 11/12, 2010).
34. "Cerebrospinal fluid biomechanics: an engineering perspective," Service de Neurologie Maladies Cérébro-Vasculaires, Centre Hospitalier Universitaire Vaudois (Lausanne, Switzerland 09/31, 2010).
35. "In vitro modeling of the spinal subarachnoid space," 6<sup>th</sup> World Congress on Biomechanics (Singapore, 09/1-6, 2010)\*.
36. "An engineering analysis of syringomyelia," University of Illinois at Chicago, Department of Radiology, MRI Research Laboratory (Chicago, Illinois, 10/24, 2008).
37. "In vitro syringomyelia hydrodynamics," Ecole Polytechnique Fédérale de Lausanne (Lausanne, Switzerland, 9/16, 2008).

***Conference presentations with published abstracts***

1. Sass LR, Khani M, Gibbs C, Freeman T, Pluid J, Elliott A, Oshinski JN, Zeller J, Stewart GR, Powell D, Petersen B, Weeks D, Carter G, Martin BA, "Quantitative assessment of intrathecal cerebrospinal fluid dynamics and geometry across large mammalian species," Hydrocephalus 2017 (Kobe, Japan, 10/23-25/2017).
2. Sass LR, Conley G, Cleveley B, Khani M, Xing T, Baledent O, Martin BA, "Neurochi: A virtual reality and in vitro model of the CSF system for teaching and research," Hydrocephalus 2017 (Kobe, Japan, 10/23-25/2017).
3. Sharp MK, Martin BA, Carrare R, "Analytic Darcy-Brinkman model for prediction of Shear-augmented dispersion in the Basement Membranes and spinal subarachnoid space," International Cerebrospinal Fluid Dynamics Society (Atlanta, Georgia, 6/19-20/2017).
4. LR Sass, M Khani, O Baledent, BA Martin, "An in vitro model of intrathecal cerebrospinal fluid dynamics with dorsal and ventral spinal cord nerve rootlets," Summer Bioengineering, Biomechanics and Biotransport (Tucson, AZ, 6/21-24, 2017).
5. Sharp MK, Carrare R, Martin BA, "Shear-Augmented Dispersion Affects Cerebrospinal Fluid Solute Transport in the Subarachnoid Space but not within the Basement Membranes in the Brain," Summer Bioengineering, Biomechanics and Biotransport (Tucson, AZ, 6/21-24, 2017).

6. Khani M, Xing T, Gibbs C, Oshinski J, Stewart GR, Zeller JR, Martin BA, "CFD model and MRI measurement of intrathecal cerebrospinal fluid dynamics in a cynomolgus monkey," PhD Student Paper Finalist, Biomechanics – Fluids, Summer Bioengineering, Biomechanics and Biotransport (Tucson, AZ, 6/21-24, 2017).
7. Nelson ES, Myers JG, Lewandowski B, Feola AJ, Werner C, Raykin J, Martin BA, Samuels B, Ethier CR, "Ocular modeling for VIP syndrome: how experimental and numerical studies can collaborate," NASA Human Research Program Investigators Workshop (Galveston, TX, 1/24, 2017).
8. Martin BA, Loth F, Luciano MG, "CSF fluid dynamics in Chiari malformation: a MRI study of longitudinal impedance," International Society for Hydrocephalus and CSF Disorders (Cartagena, Colombia, 10/8-11, 2016).
9. Bapuraj JR, Londy FJ, Martin BA, Ibrahim EH, Maher CO, Garton HJ, Muraszko KM, "New Parameters for Assessing CSF flow at the Cerebral Aqueduct and Craniovertebral Junction in Normal Subjects and Pediatric Chiari I malformations," American Society of Neuroradiology (Washington D.C., U.S.A., 4/26-27, 2016).
10. Loth F, Shaffer N, Pahlavian SH, Luciano MG, Oshinski JN, "Quantitative Assessment of the Differences in the Resistance to Spinal CSF Motion in Chiari Malformation," 3<sup>rd</sup> bi-annual meeting of the International CSF dynamics society (Amiens, France, 7/9-10, 2015).
11. Martin BA, Shaffer N, Oshinski JN, Luciano MG, Loth F, "Neural tissue deformation and cerebrospinal fluid flow impedance are positively correlated at the craniocervical junction," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).
12. Majcher MJ, Dailey MR, Lemmer DP, Havrilak JT, Leipzig N, Martin BA, "Design of a 3D bioreactor for simulation of cerebrospinal fluid flow in the third ventricle and aqueduct of sylvius," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).
13. Pahlavian SH, Loth F, Luciano MG, Martin BA, "A patient specific computational model to characterize the impact of neural tissue motion on cerebrospinal fluid dynamics at the cervical-medullary junction," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).
14. Thyagaraj S, Giese D, Santini F, Fornari E, Bunck AC, Loth F, Martin BA, "Multicenter comparison of 4D phase contrast MRI measurement of cerebrospinal fluid dynamics in the cervical spine," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).
15. Al-Jumaily A, Ashaat S, Martin BA, Pohle-Krauzer R, Krauzer ML, "Bariatric surgery improvements for obstructive sleep apnea patients," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).
16. Loth F, Martin BA, Pahlavian S, Shaffer N, Oshinski JN, Luciano MG, "CFD simulation of cerebrospinal fluid motion to assess Chiari malformation severity," International conference on CFD in medicine and biology (Albufeira, Portugal, 9/30-10/4, 2015).
17. Marty P, Urbizu A, Macaya A, Sahuquillo J, Poca MA, Martin BA, "Gender-specific differences in adult type I Chiari malformation morphometrics," 67<sup>th</sup> Meeting of the American Academy of Neurology (Washington, DC, 4/18-25, 2015).
18. Luciano M, Martin BA, Loth F, "Is Chiari malformation a structure or a movement? Cleveland Clinic-Conquer Chiari Collaboration," Chiari and Syringomyelia Foundation Research Colloquium (Boston, MA, 10/18, 2014).
19. Bapuraj R, Martin BA, "2D PC MRI assessment of Chiari malformation" International Hydrocephalus Imaging Working Group (IHIWG) (Bristol, UK, 9/5-6, 2014).
20. Kroger JR, Thyagaraj S, Giese D, Hedderich D, Morsdorf-Shulte RL, Maintz DC, Yiallourou TI, Bunck AC, Martin BA, "4D-phase-contrast evaluation of cerebrospinal fluid dynamics in a rigid-wall 3D printed in-vitro model of Chiari I Malformation with idealized spinal cord nerve roots," 100<sup>th</sup> Meeting of the Radiological Society of North America (Chicago, IL, 11/30-12/5, 2014).
21. Pahlavian SH, Bunck AC, Tubbs RS, Yiallourou TI, Loth F, Martin BA, "4D phase-contrast magnetic resonance imaging of cerebrospinal fluid velocities in the cervical spine and quantitative comparison to computational fluid dynamics," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).
22. Thyagaraj S, Pahlavian SH, Vatani M, Choi J, Goodin M, Bunck AC, Yiallourou TI, Loth F, Martin BA, "3D printed model for simulation of cerebrospinal fluid motion in the cervical spinal subarachnoid space," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).
23. Shaffer N, Martin BA, Dombrowski S, Luciano MG, Tew JM, Loth F, "Investigation of post-surgical changes to cerebrospinal fluid flow impedance in type I Chiari malformation patients," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).
24. Alves T, Bapuraj JR, Malyarenko D, Martin BA, Srinivasan A, "Principles, Techniques and Clinical Applications of Phase Contrast MRI Cerebrospinal Fluid Imaging," 52<sup>nd</sup> Annual Meeting and The Foundation of the ASNR Symposium (Montreal, Canada, 5/17-22) *submitted*.
25. Mortensen M, Mardal KA, Pahlavian SH, Martin BA, "Preliminary study of the impact of spinal cord nerve roots and denticulate ligaments on drug movement in the cervical spinal subarachnoid space," 11<sup>th</sup> World Congress on Computational Mechanics (WCCM XI), 5<sup>th</sup> European Conference on Computational Mechanics (ECCM V), 6<sup>th</sup> European Conference on Computational Fluid Dynamics (ECFD VI) (Barcelona, Spain, 6/20-25, 2014)
26. Yiallourou TI, Luciano M, Loth F, Bunck AC, Stergiopoulos N, Martin BA, "Inter-operator dependence of subject specific CFD modeling of cerebrospinal fluid dynamics at the craniocervical junction," International Society for Magnetic Resonance in Medicine (Milan, Italy, 5/10-16, 2014).

27. Martin BA, Shaffer N, Lowenkamp M, Loth F, Tew JM, Luciano MG, "Clinical importance of neural tissue deformation in type I Chiari malformation," American Society of Pediatric Neurosurgeons (Costa Rica, 1/26-31, 2014).
28. Shaffer N, Martin BA, Dombrowski S, Luciano MG, Tew JM, Oshinski JN, Loth F, "Quantitative Assessment of the Differences in Spinal CSF Dynamics in Chiari Malformation," 2<sup>nd</sup> International CSF dynamics symposium (Manhasset, New York, U.S.A., 6/24-25, 2013).
29. Shaffer N, Martin BA, Rocque B, Madura C, Iskandar B, Wieben O, Dombrowski S, Luciano MG, Oshinski JN, Loth F, "The relation of cerebrospinal fluid flow impedance and cerebellar herniation in type I Chiari malformation," ASME Summer Bioengineering Conference (Sun River, Oregon, U.S.A., 6/26-29, 2013).
30. Al-Jumaily AM, Ashaat S, Martin BA, Heinzer R, Haba-Rubio J, Stergiopoulos N, "Uvula dynamic characteristics," ASME Summer Bioengineering Conference (Sun River, Oregon, U.S.A., 6/26-29, 2013).
31. Bertram CD, Elliott NSJ, Martin BA, Brodbelt AR, "The contribution of engineering modelling to the understanding of syringomyelia pathogenesis: a review," Syringomyelia 2013 (Sydney, Australia, 2/27-3/1, 2013).
32. Bapuraj JR, Londy F, Maher CO, Martin BA, Quint DJ, Sundgren PA, Chenevert TC, Muraszko KA, "Dynamic MRI and quantitative MRI CSF flow studies in Chiari I malformations," Conquer Chiari Research Conference (Chicago, IL, 11/8-9, 2012).
33. Bapuraj JR, Londy F, Maher CO, Martin BA, Quint DJ, Sundgren PA, Chenevert TC, Muraszko KA, "The influence of neck position on CSF velocities at the cranio-cervical junction and the aqueduct of Sylvius in healthy subjects and pre- and post-operative patients with Chiari I malformation," American Society of Neuroradiology 50<sup>th</sup> Annual Meeting (New York, NY, 4/21-26, 2012).
34. Martin BA, Yiallourou TI, Stergiopoulos N, "Quantitative comparison of 4D MRI flow measurements to 3D computational fluid dynamics simulation of cerebrospinal fluid movement in the spinal subarachnoid space," International Conference on Computational Fluid Dynamics in Medicine and Biology (Dead Sea, Israel, 3/25-30, 2012).
35. Yiallourou TI, Odier C, Martin BA, Haba-Rubio J, Heinzer R, Hirt L, Stergiopoulos N, "The effect of continuous positive airway pressure on total cerebral blood flow in 23 healthy away volunteers," 10<sup>th</sup> International Workshop on Biomedical Engineering (Kos, Greece, 10/5-7, 2011).
36. Yiallourou TI, Asboth L, Kroeger JR, Maintz D, Bunck AC, Martin BA, Stergiopoulos N, "Quantitative comparison of 4D MRI flow measurements to 3D computational fluid dynamics simulation of cerebrospinal fluid movement in the spinal subarachnoid space," 10<sup>th</sup> International Workshop on Biomedical Engineering (Kos, Greece, 10/5-7, 2011).
37. Martin BA, Novy J, Balédent O, Reymond P, Stergiopoulos N, "Prediction of spinal cord perivascular flow based on a coupled computational simulation of the cardiovascular and cerebrospinal fluid system," International Society for Hydrocephalus and Cerebrospinal Fluid Disorders (Copenhagen, Denmark, 9/3-7, 2011).
38. Shahim K, Drezet JM, Martin BA, Molinari JF, Momjian SH, "Analytical model of normal pressure hydrocephalus," Swiss Federal Institute of Technology – EPFL, Material Science and Engineering EDMX Research Symposium (Lausanne, Switzerland, 3/17, 2011).
39. Martin BA, Reymond P, Balédent O, Novy J, Stergiopoulos N, "A coupled simulation of spinal cord blood flow and cerebrospinal fluid motion in the spinal subarachnoid space based on in vivo measurements," ASME Summer Bioengineering Conference (Farmington, Pa, 6/22-25, 2011).
40. Vardoulis O, Coppens E, Martin BA, Reymond P, Stergiopoulos N, "Assessment of aortic graft impact on hemodynamics," ASME Summer Bioengineering Conference (Farmington, Pa, 6/22-25, 2011).
41. Picquot A, Santini F, Block J, Fonari E, Martin BA, Stergiopoulos N, "A comparison of 4D MRI flow measurements and 3D computational fluid dynamics simulation of cerebrospinal fluid movement in the brain ventricles," International Society for Magnetic Resonance in Medicine Annual Meeting (Montréal, Canada, 5/7-13, 2011).
42. Martin BA, F. Loth, "In vitro hydrodynamic modeling of syringomyelia," International Symposium on Syringomyelia (Berlin, Germany 12/09-11, 2010).
43. Martin BA, P. Reymond, F. Loth, N. Stergiopoulos, "A 1-D coupled model of the cardiovascular tree and cerebrospinal fluid system," 6<sup>th</sup> World Congress on Biomechanics (Singapore, 9/1-6, 2010).
44. Y. Liu, Martin BA, T. J. Royston, "A series of in silico fluid structure interaction simulations of the cerebrospinal fluid pressure wave propagation in the spinal subarachnoid space," ASME 2010 International Mechanical Engineering Congress & Exposition (Vancouver, Canada, 11/12-18, 2010).
45. Martin BA, "Device and method for non-invasive measurement of vascular properties," TechConnect medtech IP submission (Anaheim, CA, June 21-25, 2010).
46. Y. Liu, Martin BA, T. J. Royston, F. Loth, "A fluid structure interaction simulation of the cerebrospinal fluid, spinal cord, and spinal stenosis present in syringomyelia," ASME Summer Bioengineering Conference (Naples, FL, 6/16-19, 2010).
47. Martin BA, S. El-Khoury, F. Loth, "The Influence of cerebrospinal fluid flow frequency and magnitude on subarachnoid space pressure fluctuations in an in vitro syringomyelia model with spinal canal stenosis," Biomedical Engineering Society Annual Meeting (Pittsburgh, Pa, 10/7-10, 2009).
48. Martin BA, F. Loth, T. J. Royston, "The interrelation of cerebrospinal fluid pulse wave velocity and biomechanical properties of the spinal canal," 10<sup>th</sup> US National Congress on Computational Mechanics, Mechanics of biological Tissues Mini-Symposium (Columbus, Ohio, 7/16-19, 2009).

49. Martin BA, F. Loth, "The influence of coughing on cerebrospinal fluid pressure in an in vitro syringomyelia model with spinal canal stenosis," ASME Summer Bioengineering Conference (Lake Tahoe, CA, 6/17-21, 2009).
50. F. Loth, Martin BA, "Engineering & imaging techniques," American Syringomyelia Alliance Project Annual Conference (Washington D.C., July, 2008).
51. F. Loth, Martin BA, "Engineering & imaging techniques," Chiari Research Conference 2008, State of the Research and New Directions (Chicago, IL, 11/6-7, 2008).
52. Martin BA, Wojciech Kalata, Francis Loth, John N. Oshinski, Michael Jerosch-Herold, "MR measurement of pulse wave velocity in the spinal canal," ASME Summer Bioengineering Conference (Marco Island, FL, 6/25-29, 2008).
53. Martin BA, "Syringomyelia apparatus demonstration," UIC/Conquer Chiari Research Symposium (Chicago, Illinois, 6/2, 2007).
54. W. Kalata, Martin BA, F. Loth, T. J. Royston, J. N. Oshinski, Jerosch-Herold, "Measurements of pulse wave velocity in the spinal canal," Biomedical Engineering Society Annual Meeting (Chicago, Illinois, 10/11-14, 2006).
55. Martin BA, W. Kalata, F. Loth, T.J. Royston, J. N. Oshinski, "An engineering approach to understanding the hydrodynamics of syringomyelia," ASAP Annual National Conference (Cedar Rapids, Iowa, 7/20-23, 2005).
56. T. Spohnholtz, T. J. Royston, Y. Yazicioglu, Martin BA, F. Loth, H. Bassiouny, "A multimode sonic & ultrasonic diagnostic imaging system with application to peripheral vascular characterization," 149th Meeting of the Acoustical Society of America (Vancouver, Canada, 5/16-20, 2005).
57. W. Kalata, Martin BA, F. Loth, J. N. Oshinski, "Differences in cerebrospinal fluid motion in Chiari malformation patients and healthy volunteers," 3<sup>rd</sup> Annual Neural Hydrodynamics Symposium (Cleveland, OH, 5/12-14, 2005).
58. Martin BA, W. Kalata, F. Loth, J. N. Oshinski, T. J. Royston, "Experimental syringomyelia hydrodynamics: the importance of pressure phase relation on syrinx pathogenesis," 3<sup>rd</sup> Annual Neural Hydrodynamics Symposium (Cleveland, OH, 5/12-14, 2005).
59. Martin BA, W. Kalata, F. Loth, T. J. Royston, J. N. Oshinski, "An experimental investigation of the hydrodynamic and biomechanical environment present in syringomyelia," ASME Summer Bioengineering Conference (Vail, CO, 5/22-26, 2005).
60. Martin BA, W. Kalata, J. N. Oshinski, F. Loth, "An engineering perspective on syringomyelia," ASAP Annual National Conference (Key Biscayne, FL, 6/21-24, 2004).
61. Martin BA, W. Kalata, T.J. Royston, J. N. Oshinski, F. Loth, "Experimental study on pressure and hydrodynamic flow within the subarachnoid space," 2nd Symposium of Neural Hydrodynamics (Menlo Park, CA, 5/1, 2004).
62. Martin BA, F. Loth, J. N. Oshinski, "Physical characterization of pressure wave transmission in a fluid filled syrinx," Proceedings of the Neurohydrodynamic Symposium (6/1, 2004).
63. Martin BA, W. Kalata, J. N. Oshinski, F. Loth, "Importance of mechanical forces in the development of syringomyelia for patients with Chiari malformation," ASAP Annual Conference (New York City, NY, 7/1, 2003).
64. Martin BA, W. Kalata, J. N. Oshinski, F. Loth, "Engineering perspective on diseases related to CSF motion," University of Chicago in the Department of Neurosurgery Grand Rounds (Chicago, IL, 6/6, 2003).

### ***Conference posters***

1. McCain K, Sass L, Khani M, Carter G, Weeks D, Wiest M, Petersen B, Wingett D, Freeman T, Martin BA, "MRI based biomarkers for characterization of ALS," University of Idaho, Idaho INBRE conference (Moscow, ID, 8/2, 2017).
2. Conley G, Cleveley B, Oles J, Sass L, Xing T, Baledent O, Kurtcuoglu V, Martin BA, "Neurochi virtual reality simulator of the cerebrospinal fluid system," University of Idaho, Idaho INBRE conference (Moscow, ID, 8/2, 2017).
3. Sater S, Sass A, Aldrimk B, Rohr J, Stenger M, Macias B, Martin BA, "Reliability assessment of Optic Nerve Trajectory in Long-duration Space Flight Astronauts," University of Idaho, Undergraduate Student Research Symposium (Moscow, ID, 4/24, 2017).
4. Conley G, Cleveley B, Sass L, Xing T, Baledent O, Kurtcuoglu V, Martin BA, "A 3D Anatomic Model of the Intracranial Cerebrospinal Fluid System Based on MRI Measurements and Neurosurgical Literature Review," University of Idaho, Undergraduate Student Research Symposium (Moscow, ID, 4/24, 2017).
5. Majors C, Aldrimk B, Sass L, Martin BA, "Prototype 3D-printed Oscillatory Flow Pump for Simulation of Cerebrospinal Fluid Flow," University of Idaho, Undergraduate Student Research Symposium (Moscow, ID, 4/24, 2017).
6. G. Conley Natividad, B. Cleveley, LR Sass, T Xing, O Baledent, V Kurtcuoglu, BA Martin, "Neuroculus virtual reality simulator of the cerebrospinal fluid system," Undergraduate Student Paper Competition Finalist, Summer Bioengineering, Biomechanics and Biotransport (Tucson, AZ, 6/21-24, 2017).
7. MV DaSilva Ferreira, BA Martin, "MRI-based assessment of cerebrospinal fluid pulse wave velocity in the upper cervical spine," University of Idaho Undergraduate Research Symposium (Moscow, ID, 2016).
8. M. Wransky, D. McQuaide, J. Strahle, C. O. Maher, M. Espanol, F. Loth, BA Martin, "Machine learning and morphometric analysis of asymptomatic and symptomatic Type 1 Chiari malformation patients," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).

9. S. H. Pahlavian, A. C. Bunck, R. S. Tubbs, T. Yiallourou, F. Loth, BA Martin, "Quantitative Comparison of 4D Phase-Contrast Magnetic Resonance Imaging and Subject-Specific Computational Fluid Dynamics Simulation of Cerebrospinal Fluid Velocities in Cervical Spine," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).
10. S. Thyagaraj, S.H. Pahlavian, M. Vatani, J. Choi, M. Goodin, A. Bunck, T. Yiallourou, F. Loth, BA Martin, "3D printed model of the cervical spine for simulation of cerebrospinal fluid motion: comparison of in vitro and computational fluid dynamics simulation results," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).
11. N. Shaffer, BA Martin, S. Dombrowski, M. Luciano, J. Tew, F. Loth, "Investigation of post-surgical changes to cerebrospinal fluid hydrodynamics in type I Chiari malformation patients," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).
12. M. Majcher, N. Shaffer, F. Loth, M. Luciano, J. Oshinski, B. Martin, "Quantification of neural tissue deformation in type I Chiari malformation patients pre- and post-spinal decompression surgery and comparison to controls," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).
13. D. Casey, BA Martin, G. Bateman, S. H. Pahlavian, N. Shaffer, K. Smith Jr., F. Loth, "Numerical Simulation of Superior Sagittal Sinus Hemodynamics," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).
14. M. Wransky, M. Espanol, A. Urbizu, F. Loth, BA Martin, "Machine learning for the detection of type 1 Chiari malformation without using tonsillar herniation measurement," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).
15. R. Kenyon, S. Thyagaraj, N. Leipzig, F. Loth, BA Martin, "An in vitro hydrodynamic model of the spinal subarachnoid space with arachnoid trabeculae," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).
16. M. Majcher, N. Shaffer, F. Loth, M. Luciano, J. Tew, M. Lowenkamp, BA Martin, "Quantification of axial spinal cord displacement in type 1 Chiari malformation," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).
17. M. Majcher, N. Shaffer, F. Loth, M. Luciano, J. Oshinski, BA Martin, "Measurement of brain and spinal cord tissue motion in type 1 Chiari malformation by phase contrast magnetic resonance imaging," University of Akron Student Innovation Symposium (Akron, OH, 4/10, 2014).
18. Chen T, Lowenkamp M, Shaffer N, and B Martin. "Syrinx Formation over 1 week in Chiari I Malformation: CSF velocity quantification before and after surgery," AANS/CNS Section on Pediatric Neurological Surgery (Toronto, Canada, 12/2013).
19. M. Wransky, M. Espanol, B. Martin, "MRI-based Classifiers in Chiari Malformation," Midstates Conference for Undergraduate Research in Computer Science and Mathematics (Delaware, OH, U.S.A., 11/16, 2013).
20. S.H. Pahlavian, T.I. Yiallourou, R. S. Tubbs, A. Bunck, M. Goodin, F. Loth, M. Rasee, Martin BA, "Cerebrospinal fluid dynamics in the cervical spine: importance of fine anatomical structures," ASME Summer Bioengineering Conference (Sun River, Oregon, U.S.A., 6/26-29, 2013).
21. Martin BA, N. Stergiopoulos, "Prediction of the impact of craniospinal compliance on the relative timing of arterial and cerebrospinal fluid pulsations and perivascular fluid flow into the spinal cord," ASME Summer Bioengineering Conference (Fajardo, Puerto Rico, 6/20-23, 2011).
22. T. Yiallourou, A. Bunck, J. Kroeger, N. Stergiopoulos, Martin BA, "4D MRI flow quantification of cerebrospinal fluid motion in the cervical spine in healthy subjects and Chiari malformation patients: how do the results compare with 3D computational fluid dynamics?," ASME Summer Bioengineering Conference (Fajardo, Puerto Rico, 6/20-23, 2011).
23. B. D. Anthikat-Alpert, T. Yiallourou, J. Haba-Rubio, R. Heinzer, E. Fonari, N. Chevrey, F. Santini, N. Stergiopoulos, Martin BA, "Continuous positive airway pressure impacts cerebral blood flow and cerebrospinal fluid motion: a phase contrast MRI study," ASME Summer Bioengineering Conference (Fajardo, Puerto Rico, 6/20-23, 2011).
24. T. I. Yiallourou, C. Odier, Martin BA, J. Haba-Rubio, R. Heinzer, L. Hirt, N. Stergiopoulos, "The effect of continuous positive airway pressure on total cerebral blood flow in 23 healthy away volunteers," ASME Summer Bioengineering Conference (Farmington, Pa, 6/22-25, 2011).
25. Martin BA, T. J. Royston, J. N. Oshinski, F. Loth, "Towards non-invasive assessment of the elastic properties of the spinal aqueduct," ASME Summer Bioengineering Conference (Lake Tahoe, CA, 6/17-21, 2009).
26. Martin BA, R. Labuda, T. J. Royston, J. N. Oshinski, B. Iskandar, F. Loth, "Pathological biomechanics of cerebrospinal fluid pressure in syringomyelia: fluid structure interaction of an in vitro coaxial elastic tube system," ASME Summer Bioengineering Conference (Lake Tahoe, CA, 6/17-21, 2009).
27. Martin BA, J. Seil, F. Loth, S. McCormack, T. J. Royston, "Epithelial cell growth on compliant biomaterial (Nusil CF11)," Biomedical Engineering Society Annual Meeting (Chicago, Illinois, 10/11-14, 2006).
28. E. Mason, Martin BA, Y. Yazicioglu, F. Loth, T. J. Royston, I. Nicolaescu, "In vitro and in vivo piezoelectric sensor for measurement of pulse wave velocity," Biomedical Engineering Society Annual Meeting (Chicago, Illinois, 10/11-14, 2006).

29. Martin BA, W. Kalata, F. Loth, J. N. Oshinski, T. J. Royston, "Characterization of pressure wave transmission in a fluid filled syringe," Biomedical Engineering Society Annual Meeting (Chicago, Illinois, 10/11-14, 2006).
30. T. Spohnholtz, T. J. Royston, Y. Yazicioglu, Martin BA, F. Loth, H. Bassiouny, "Helping doctors interpret the sound of blood using a multimode sonic and ultrasonic imaging system," 149<sup>th</sup> Meeting of the Acoustical Society of America, lay language paper (Vancouver, Canada, 5/16-20, 2005).
31. Y. Yazicioglu, T. J. Royston, T. Spohnholtz, Martin BA, F. Loth, H. Bassiouny, "Coupled vibration and sound radiation from a fluid-filled and submerged or embedded vascular tube with internal turbulent flow due to a constriction," 149<sup>th</sup> Meeting of the Acoustical Society of America (Vancouver, Canada, 5/16-20, 2005).
32. W. Kalata, Martin BA, et. al, "Hydrodynamics of cerebrospinal fluid in spinal canal with Chiari malformation and syringomyelia," Bioengineering Session, American Society of Mechanical Engineers National Conference (Anaheim, CA, 11/13-19, 2004).
33. Martin BA, W. Kalata, J. N. Oshinski, F. Loth, T. J. Royston, "Construction and validation of a complaint model of the cerebrospinal fluid system with fluid filled syringe," 2004 ASME International Mechanical Engineering Congress & Exposition (Anaheim, CA, 11/13-19, 2004).
34. W. Kalata, Martin BA, F. Loth, T. J. Royston, J. N. Oshinski, "Hydrodynamics of cerebrospinal fluid in spinal canal with Chiari malformation and syringomyelia," Bioengineering Poster Session, American Society of Mechanical Engineers National Conference (Anaheim, CA, 11/13-19, 2004).
35. Y. Yazicioglu, T. J. Royston, T. Spohnholtz, Martin BA, F. Loth, "Coupled vibration of a fluid-filled and submerged vascular tube with internal transitional / turbulent flow due to a constriction," in Proceedings of the 148th Meeting of the Acoustical Society of America, (San Diego, CA, 11/1, 2004).

**Patents:*****Patent applications under review***

1. PCT/EP2010/051320, Martin BA, “Device and method for non-invasive measurement of cerebrovascular properties,” (provisional filed 2/3, 2012, Ecolé Polytechnique Fédérale de Lausanne, Switzerland).
2. US 2006/0089557 A1, Liliana Grajales, Martin BA, Ion V. Nicolaescu, Iwona turlik. “Method and apparatus to facilitate heart rate detection,” (published 10/27, 2004, Motorola, Inc., Schaumburg, IL).

***Invention disclosures***

1. Martin BA, Maughan M, Gibbs C, Deans B, Souvenir B, Harlow M, Aljawi M, “Biomechanical Indenter Pen,” enabling disclosure, (submitted 4/2017, University of Idaho, ID).
2. Martin BA, Sass L, “Anthropomorphic cerebrospinal fluid system model,” invention disclosure, (filed 7/7, 2016, University of Idaho, ID).
3. Pahlavian SH, Labuda R, Eppelheimer M, Loth F, Martin BA, Urbizu AS, “Software for Automated Morphometrics of Skull Based Diseases,” invention disclosure, (filed 12/10, 2015, University of Akron, OH) USPTO 62/265,666.
4. Martin BA, “Subject-specific prediction and optimization of intrathecal (IT) drug and gene therapy (GT) based on 4D phase contrast magnetic resonance imaging and computational modeling,” invention disclosure, (filed 5/9, 2014, University of Akron, OH).
5. Martin BA, “Device and method for noninvasive alteration of intracranial pressure oscillations via a cardiac triggered continuous positive airway pressure device,” invention disclosure, (filed 10/12, 2012, University of Akron, OH).
6. Martin BA, “Device and method for non-invasive measurement of cerebrovascular properties,” invention disclosure (filed 12/11, 2009, Ecolé Polytechnique Fédérale de Lausanne, Switzerland).
7. Martin BA, “Automated laser aspiration system,” invention disclosure (filed 7/15, 2009, Ecolé Polytechnique Fédérale de Lausanne, Switzerland).
8. Martin BA, F. Loth, “Cerebrospinal fluid system model,” invention disclosure (filed 3/4, 2009, University of Akron, OH).
9. Martin BA, F. Loth, “System and method for research of patient entered medical information,” (filed 3/24, 2009, University of Akron, OH).
10. F. Loth, Martin BA, R. Labuda, J. Oro, J. N. Oshinski, “Device and method for measurement of tension and elastic properties of the spinal cord and filum terminale,” invention disclosure (filed 3/2, 2009, University of Akron, OH).
11. T. J. Royston, Spohnholtz, F. Loth, Y. Yazicioglu, Martin BA, “A multimode sonic & ultrasonic diagnostic imaging method,” invention disclosure (filed 3/1, 2004, University of Illinois at Chicago, IL).
12. T. J. Royston, Spohnholtz, F. Loth, Martin BA, “New acoustic skin-contact hydrophone sensor array pad for medical diagnosis and monitoring,” invention disclosure (filed 3/1, 2004, U. of Illinois at Chicago, IL).

**Grants and Contracts Awarded:*****Ongoing grants (Martin as PI or mentor)***

1. **An in vitro platform for pharmacokinetic quantification of intrathecal infusion devices**  
 Source: Industry (Alcyone Lifesciences)  
 Funding: \$58,000, 07/23/2017 – 12/23/2017  
 Investigators: Martin BA (PI)
2. **Investigating the Impact of Arachnoid Trabeculae on Brain Tissue Stresses in Sports-Related Traumatic Brain Injury (TBI)**  
 Source: NIH Grant No.P20 GM103408 (National Institute of General Medical Sciences) / Idaho INBRE  
 Funding: \$134,692, 05/01/2017 – 04/30/2019  
 Investigators: Martin BA (PI), Schiele (Co-I), Potirniche (Co-I), Mortazavi (Co-I), Tanner (Co-I)
3. **Hydrodynamic Simulator for Brain Therapeutic Development**  
 Source: Vandal Ideas Project (Internal Competitive Grant, University of Idaho)  
 Funding: \$75,000, 07/01/2016 – 08/31/2017  
 Investigators: Martin BA (PI), Xing (co-I), Cleveley B (co-I)
4. **Advanced Ocular and Brain MRI of Astronauts Following Long Duration Space Flight**  
 Source: NASA, Idaho Space Grant Consortium  
 Funding: \$25,000, 8/1/2016-7/31/2017  
 Investigators: Martin BA (PI)
5. **Engineering Grand Challenges Scholars**  
 Source: University of Idaho (internal)  
 Funding: \$5,950, 3/1/2017-2/28/2018  
 Investigators: Martin BA (Mentor for G. Conley and T. Freeman)
6. **Idaho Space Grant Consortium Graduate Student Fellowship**  
 Source: Idaho Space Grant Consortium  
 Funding: \$25,000, 6/2017-5/2018  
 Investigators: Martin BA (Mentor for MS Student, J Rohr)
7. **Idaho Space Grant Consortium Undergraduate Student Fellowship**  
 Source: Idaho Space Grant Consortium  
 Funding: \$2,500, 6/2017-5/2018  
 Investigators: Martin BA (Mentor for BE student Austin Sass)

***Ongoing grants (Martin as Co-I)***

1. **Simulations of CSF, Hemodynamics and Ocular Risk (VIIP SCHOLAR)**  
 Source: NASA, NNX16AT06G  
 Funding: \$750,000 total, \$97,000 to Martin BA (Co-I), 10/01/2016 – 09/30/2019  
 Investigators: Ethier R (PI), Martin BA (Co-I)
2. **Highly Accelerated Simultaneous Multi-Slice Phase Contrast MRI**  
 Source: NIH, NIMH, 1R44MH112210-01A1  
 Funding: \$1,287,772 total, \$47,529 to Martin BA, 08/01/2016 – 07/31/2018  
 Investigators: Feinberg (PI), Martin BA (Co-I)
3. **Visualizing Science**  
 Source: Vandal Ideas Project (Internal Competitive Grant, University of Idaho)  
 Funding: \$60,000 7/2016 – 9/2017  
 Investigators: Machlis S (co-PI), Rowley R (co-PI), Martin BA (Co-I)



**Completed grants**

1. **Summer Undergraduate Research Fellowship, University of Idaho (B. Aldrimk)**  
 Source: University of Idaho (internal)  
 Funding: \$6,000, 6/2017-8/2017  
 Investigators: Martin BA (Mentor for ME student Brian Aldrimk)
2. **University of Washington Medical Student Research Training Programs (MSRTP) Fellowship**  
 Source: Idaho Space Grant Consortium  
 Funding: \$6,000, 6/2017-8/2018  
 Investigators: Martin BA (Mentor for WWAMI student, B. Lawrence)
3. **Idaho INBRE Summer Undergraduate Research Fellowship (G. Conley)**  
 Source: University of Idaho (internal)  
 Funding: \$6,000, 5/10/2017-7/31/2017  
 Investigators: Martin BA (Mentor for G. Conley)
4. **Idaho INBRE Summer Undergraduate Research Fellowship (K. McCain)**  
 Source: University of Idaho (internal)  
 Funding: \$6,000, 5/10/2017-7/31/2017  
 Investigators: Martin BA (Mentor for K. McCain)
5. **MRI-based Biomarkers for Amyotrophic Lateral Sclerosis**  
 Source: 4U54GM104944-04 NIH General Medical Sciences (CTR – Infrastructure Network)  
 Funding: \$68,500, 8/1/2016-6/30/2017  
 Investigators: Martin BA (PI)
6. **Biomechanical Characterization and Modeling of Arachnoid Trabeculae in Traumatic Brain Injury**  
 Source: NIH Grant No.P20 GM103408 (National Institute of General Medical Sciences) / Idaho INBRE  
 Funding: \$13,357, 1/1/2017-4/30/2017  
 Investigators: Martin BA (PI)
7. **A subject-specific computational simulator of intrathecal drug dispersion in non-human primates**  
 Source: Industry (Voyager Therapeutics)  
 Funding: \$166,953, 09/2015-9/2016  
 Investigators: Martin BA (PI)
8. **Multicenter in vitro assessment of 4D PC MRI for quantification of CSF motion**  
 Source: American Syringomyelia and Chiari Alliance Project  
 Funding: \$53,568 to Martin BA, 08/2013 – 05/2016  
 Investigators: Martin BA (PI)
9. **Identification of MRI parameters and genetic factors for diagnosis of Chiari malformation**  
 Source: Chiari and Syringomyelia Patient Education Foundation  
 Funding: \$22,296, 03/2015 – 03/2016  
 Investigators: Martin BA (PI)
10. **MRI morphometric traits of Type 1 Chiari malformation across age and gender**  
 Source: Chiari and Syringomyelia Patient Education Foundation  
 Funding: \$37,840, 03/2015 – 03/2016  
 Investigators: Martin BA (PI)
11. **A Chiari Malformation MR image database**  
 Source: Chiari and Syringomyelia Patient Education Foundation  
 Funding: \$61,064, 04/2014-03/2016  
 Investigators: Loth F (PI), Martin BA (Co-I)
12. **MRI-directed identification of genetic risk factors in Chiari Malformation in men and women**  
 Source: Fundacion Ramon Areces Post-doctoral Fellowship Award  
 Funding: 36,000 EUR, 10/2014-10/2016

Investigators: Martin BA (mentor), Urbizu A (post-doc fellow)

**13. MRI quantification of brain and nerve damage in Chiari I malformation**

Source: Chiari and Syringomyelia Patient Education Foundation  
 Funding: \$142,177, 02/2013 – 12/2015  
 Investigators: Martin BA (co-PI)

**14. Transcriptional profiling and  $\mu$ CT assessment of a syringomyelia rat model**

Source: Chiari and Syringomyelia Patient Education Foundation  
 Funding: \$97,651, 10/2012 – 10/2015  
 Investigators: Leipzig N (PI), Martin BA (Co-I)

**15. MRI Based Classification of Chiari Malformation**

Source: Chiari and Syringomyelia Patient Education Foundation  
 Funding: \$33,309, 01/2014-06/2015  
 Investigators: Espanol M (PI), Martin BA (Co-I)

**16. Metabolic and Inflammatory Alterations in Patients with Chiari Malformation**

Source: Chiari and Syringomyelia Patient Education Foundation  
 Funding: \$59,053, 01/2014-06/2015  
 Investigators: Shriver L (PI), Martin BA (Co-I)

**17. An in vitro assessment of 4D PC MRI quantification of cerebrospinal fluid dynamics**

Source: Swiss Nat. Science Foundation (Grant No. IZK0Z2\_152766), Int. Short Visit  
 Funding: \$12,228, 04/2014 – 06/2014  
 Investigators: Fornari E (PI), Martin BA (Co-I)

**18. Pressure oscillations: a new lung therapy approach**

Source: Marie Curie Actions (Grant No. FP7-PEOPLE-2011-IIF) Int. Incoming Fellowships  
 Funding: \$166,252, 10/2012-10/2013  
 Investigators: Martin BA (Co-I), Al-Jumaily A (Co-I), Stergiopoulos N (administrator)

**19. Development of a coupled hydrodynamic model of the cardiovascular and cerebrospinal fluid system**

Source: Swiss National Science Foundation (Grant No. 205321\_132695 / 1)  
 Funding: 351,976 CHF direct, 01/2010-09/2013  
 Investigators: Stergiopoulos N (PI), Martin BA (Co-I)

**20. A model system for teaching neurohydrodynamics**

Source: NSF, SBIR Phase I (Grant No. 1214752)  
 Funding: \$149,763, 2012  
 Investigators: Radojicic M (PI), Martin BA (consultant)

**Honors and Awards:**

Medical Advisory Panel Member for the Chiari Project Foundation	2017 –
Elected Executive Board Member of the International Society for Hydrocephalus and CSF Disorders	2015 – 2017
Distinguished Alumni Award, College of DuPage, Glen Ellyn, IL	2015
Outstanding researcher award from Conquer Chiari Patient Education Foundation	2013
Keynote Speaker at Akron General Hospital Post-grad Symposium (06/06, 2013), Akron, OH.	2013
NPR radio on my research, WKSU 89.7, “Engineering a Chiari breakthrough,” (03/04, 2013)	2013
Co-leader of the International Hydrocephalus Imaging Working Group, New York, NY, U.S.A.	2011 –
Board of Director member of the International Cerebrospinal Fluid Dynamics Society	2011 –
Selected as entrepreneurial speaker at the medTech IP conference (06/21, 2010), Anaheim, CA	2010

**Major Committee Assignments:**

*National review panels and committees:*

NASA, Human Research Program (HRP), Visual Impairment Intracranial Pressure Syndrome	2017 March
NIH, Common Data Elements, Chiari I Malformation, Imaging Diagnostics Panel Member	2016
NIH, Bioengineering, Technology and Surgical Sciences Study Section, Review Panel	2016 June
American Heart Association, Bioengineering Clinical Committee, Review Panel	2016 October
American Heart Association, Bioengineering Clinical Committee, Review Panel	2016 April
NIH NINDS Common Data Elements Committee for Chiari Malformation	2016
American Heart Association, Bioengineering Clinical Committee, Review Panel	2015 March
NASA, Non-Advocate Review Panel Member, Review Panel	2014
Auckland University of Technology (AUT), Strategic Research Investment Fund, Review Panel	2014

*University:*

P&T Review Committee for Biological Engineering, Full Professor (1)	2016
P&T Review Committee for Mathematics, Assistant Professor (1)	2016
Attendance at University Faculty Meetings	2015 – present
Graduate Student Fellowship Support Program, Member	2017 – present

*College:*

College Marshall for 2016 Fall Commencement	2016
Attendance at COE Faculty Meetings	2015 – present

*Departmental:*

Biological Engineering Department ByLaw Committee	2016
Biological Engineering Facebook page manager (published 30+ articles)	2016
Meetings with potential BE students (20+ students for 30 minute meetings)	2015 – present
Led Biological Engineering new student enrollment outreach event at Moscow High School	2016
Calling campaign, called 10+ potential BE students	2016F
Calling campaign, called 10+ potential BE students	2017S

*Other:*

Volunteer Judge for “Idaho Pitch” Entrepreneurship event	2017S
Volunteer Judge for “Idaho Pitch” Entrepreneurship event	2017F
Idaho INBRE member and student mentor	2017
Office of Undergraduate Research SURF student mentor	2017
University of Washington / WWAMI MSRTP medical student mentor	2017

**Professional and Scholarly Organizations**

*Society leadership:*

Biofluids and Biotransport Session, Chair and Organizer, World Congress on Biomechanics	2017 – 2018
Biofluids Theme Abstract Chair, SB <sup>3</sup> C, Summer Bioengineering, Biomechanics, Biotransport –	2017
Executive Board Member, International Society for Hydrocephalus and CSF Disorders	2015 – 2017
Co-leader and Board Member, International Hydrocephalus Imaging Working Group, IHIWG.org	2011 – present
Executive Board Member, International CSF Dynamics Society	2012 – present
Biofluids Theme Chair, Summer Biomechanics, Bioengineering, Biotransport Conference (SB <sup>3</sup> C)	2016 – present
Board Member, The Chiari Project Foundation	2017 – present

*Professional society membership:*

ASME, American Society of Mechanical Engineers, Biomedical Engineering Division	2004 – Present
BMES, Biomedical Engineering Society	2015 – Present
ASNR, American Society of Neuroradiology	2012 – Present
ISMIRM, International Society of Magnetic Resonance Imaging	2014 – Present
ISHCFD, International Society for Hydrocephalus and Cerebrospinal Fluid Disorders	2011 – Present
APS, American Physiological Society	2011 – 2015
ISCBFM, International Society for Cerebral Blood Flow and Metabolism	2009 – 2015
International Spinal Cord Society	2011

American Syringomyelia Alliance Project	2006 – 2007
ASA, Acoustical Society of America	2005
BMES, Biomedical Engineering Society	2006
EWB, Engineers Without Borders U.S.A.	2003 – 2007

*Journal reviewer for:***6 papers reviewed in 2017****9 papers reviewed in 2016****4 papers reviewed in 2015**

American Journal of Physiology: Heart and Circulatory Physiology  
 ASME Journal of Biomechanical Engineering  
 Acta Neurologica Scandanavica  
 Developmental Neurorehabilitation  
 Fluids and Barriers of the CNS  
 IEEE Transactions on Biomedical Engineering  
 Medical Engineering and Physics  
 Neuroradiology  
 Neurosurgery  
 Journal of Biomechanics  
 Journal of Neurology, Neurosurgery, and Psychiatry  
 Journal of Neuroscience  
 PLOS one  
 Royal Society – Interface Focus  
 World Neurosurgery

*Abstract reviewer for:*

Summer Biomechanics, Bioengineering and Biotransport Meeting (SB3C.com)	2016
Summer Biomechanics, Bioengineering and Biotransport Meeting (SB3C.com)	2015
World Congress on Biomechanics	2014
American Society of Mechanical Engineers, Summer Bioengineering Conference	2012 – 2013

*Student presentation judge for:*

American Society of Mechanical Engineers, Summer Bioengineering Conference	2010 – 2015
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**Conferences organized**

1. Hydrocephalus 2017, Hydrocephalus Society Conference (Kobe, Japan, 10/23-25, 2017), *International organizing & scientific committee.*
2. International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Cartagena, Colombia, 10/8-11, 2016), *International organizing & scientific committee.*
3. “Summer Biomechanics, Biotransport and Bioengineering Conference (SB<sup>3</sup>C),” (Snowbird, UT, U.S.A., 6/17-20, 2015), *Member at Large, Conference Organizing Committee.*
4. “2<sup>nd</sup> CSF International CSF Dynamics Symposium,” Feinstein Institute for Medical Research (Long Island, NY, 06/24-25, 2013), *Co-organizer and Conference Chair.*
5. “1<sup>st</sup> Conquer Chiari Research Center Open House,” Engineering Research Center, University of Akron (Akron, OH, 04/27, 2013), *Conference Organizer.*

**Symposiums and workshops organized**

1. “International Hydrocephalus Imaging Working Group Symposium (IHIWG),” International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Kobe, Japan, 10/23-25, 2017), *Co-organizer.*
2. “Biomechanics of the Central Nervous System,” Track: Biofluids and Biotransport, World Congress on Biomechanics (Dublin, Ireland, 07/8-12, 2018), *Session Organizer.*
3. 54<sup>th</sup> Meeting of the American Society of Neuroradiology, “CSF Flow Study Group (IHIWG)” (Long Beach, CA, U.S.A., 04/27-28, 2017), *Co-Organizer.*
4. “International Hydrocephalus Imaging Working Group Symposium (IHIWG),” International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Cartagena, Colombia, 10/8-11, 2016), *Co-organizer.*
5. 53<sup>rd</sup> Meeting of the American Society of Neuroradiology, “CSF Flow Study Group (IHIWG)” (Washington, D.C., U.S.A., 05/26-27, 2016), *Co-Organizer.*

6. "International Hydrocephalus Imaging Working Group Symposium (IHIWG)," International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Banff, Canada, 09/17, 2015), *Chair and Co-organizer*.
7. "International Hydrocephalus Imaging Working Group Symposium (IHIWG)," International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Bristol, UK, 09/5-6, 2014), *Organizer and Co-chair*.
8. "CSF Dynamics Mini-Symposia," World Congress on Biomechanics (Boston, MA, 06/11, 2014), *Organizer and Co-chair*.
9. "Hydrocephalus and CSF Flow Working Group," 52<sup>nd</sup> Meeting of the American Society of Neuroradiology, ASNR (Montreal, Canada, 05/22-23, 2014), *Co-organizer*.
10. "Controversies in Hydrocephalus and CSF Flow (IHIWG) Workshop," 51<sup>st</sup> Meeting of the American Society of Neuroradiology (San Diego, CA, 05/23-24, 2013), *Co-organizer*.

***Conference sessions chaired/co-chaired***

1. "Research in iNPH," Hydrocephalus 2017, International Society for Hydrocephalus and Cerebrospinal Fluid Disorders (Kobe, Japan, 09/23, 2017), *Session Chair*.
2. "Biomechanics of the Central Nervous System," Track: Biofluids and Biotransport, World Congress on Biomechanics (Dublin, Ireland, 07/8-12, 2018), *Session Chair*.
3. "MR Elastography," IHIWG / ISHCSFD Conference (Banff, Canada, 09/18, 2015), *Session Chair*.
4. "Pathophysiology of type 1 Chiari malformation," American Society of Neuroradiology, CSF flow study group (Chicago, IL, 5/1, 2015), *Session Chair*.
5. "Cerebrospinal fluid MRI diagnostics," International Society of Hydrocephalus and CSF disorders (Bristol, UK, 09/5-8, 2014), *Session Chair*.
6. "Cerebrospinal Fluid Dynamics Symposium," 7<sup>th</sup> World Congress of Biomechanics (Boston, MA, U.S.A., 06/06-11, 2014), *Session Chair*.
7. "Session D," 1<sup>st</sup> International CSF Dynamics Symposium, Swiss Federal Institute of Technology (Zurich, Switzerland, 07/08/2011), *Session Chair*.
8. "Session G: Spinal Cord," 2<sup>nd</sup> International CSF Dynamics Symposium, Feinstein Institute for Medical Research (Manhasset, NY, 06/25/2013), *Session Chair*.

**Outreach Service:*****Publicity and media coverage of research***

1. "Research shows astronauts' vision can get worse in space." 7/6/2017, (KREM channel 2 news, Spokane, WA, <http://www.krem.com/news/local/latah-county/research-shows-astronauts-vision-can-get-worse-in-space/454790398>).
2. "Blind Spot, Humans have long dreamed of traveling through the far reaches of space – populating other planets and creating societies there. NASA has announced it hopes to send humans to Mars in the 2030. But how do you "boldly go where no one have gone before" if you can't see where you are going?" (University of Idaho, Here We Are Idaho, Alumni Magazine, Spring 2017, [https://issuu.com/uidaho/docs/hwhi-2017\\_spring\\_56pgs\\_issuu](https://issuu.com/uidaho/docs/hwhi-2017_spring_56pgs_issuu)).
3. "Fit to serve, Fit to Serve: Biological Engineering Student Feeds the Homeless, Fights Wildfires and Prepares for Medical School," (University of Idaho, College of Engineering, 2017, <https://www.uidaho.edu/engr/news/features/christina-gibbs>).
4. "Engineering student uses mapping and imaging to reveal unknown," (University of Idaho, Vandals in Focus 2017, student research magazine, <https://goo.gl/z1bHIF>).
5. Pritchard Art Gallery, "Visualizing Science - Nebulus," Installation by Casey Doyle and Bryn Martin," (Moscow, ID, 2/10/2017 – 4/15/2017, <https://www.uidaho.edu/caa/galleries-centers-and-labs/prichard/exhibits/vscience>).
6. University of Idaho Video Publicity Feature, "Visualizing Science, Casey Doyle & Bryn Martin," (Moscow, ID, 4/19/2017, <https://www.youtube.com/watch?v=pfS707Pw19w>).
7. Inland 360.com, "Art: visualizing science channels fact through imagination," (Jennifer K Bauer, Spokane, WA, 3/8/2017, <https://goo.gl/2h61dU>).
8. Moscow-Pullman Daily News, "UI senior works to cure cancer," (Josh Babcock, Moscow, ID, 5/14, 2016, <http://goo.gl/rCdWiC>).
9. National Public Radio, WKSU, Exploradio, "Engineering a Chiari breakthrough," (Jeff St. Clair, Kent, OH, 3/4, 2013, <http://bit.ly/16JdIut>), re-aired several times in 2014.
10. Akron Beacon Journal, "UA tackles brain disorder," (Cheryl Powell, Akron, OH, 6/25, 2012, <http://bit.ly/ZTdjiv>).
11. University of Akron Online Newsroom, "When does a headache need an engineer to fix it?," (6/24, 2012, <http://bit.ly/ZKeJxI>).
12. Scicasts, "University receives funding for research center to treat patients with Chiari malformation," (6/27, 2012, <http://bit.ly/OvrlpE>).
13. Chiari and Syringomyelia Foundation, New Researchers Feature, "The influence of coughing on cerebrospinal fluid pressure in an in vitro syringomyelia model with spinal subarachnoid space stenosis," (6/1, 2009, <http://bit.ly/13buPpY>).
14. Conquer Chiari Foundation, In the Spotlight, "Dr. Bryn Martin, CCRC Director," (7/1, 2012, <http://bit.ly/XYZdQ5>).

**Community Service:** (non-academic unrelated to employment)

Sponsor and donor, Family Promise of the Palouse, Interfaith Hospitality Network for Homeless Families

**Honors and Awards:**

None.

**PROFESSIONAL DEVELOPMENT:****Teaching:**

None.

**Scholarship:**

See above for conferences/symposiums/workshops attended.

**Outreach:**

Presentation	"Reverse Engineering the Brain" Idaho INBRE Summer Undergraduate Fellows	05/22/17
Lab tour	"Neurophysiological Imaging and Modeling Laboratory" Eng. Grand Challenges	2017
Outreach	Led Biological Engineering new student enrollment outreach event at Moscow High School	2016

**Administration/Management:**

None.