


Landon H. Tompkins



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I am a bio- and mechanical engineer with 12 years' experience in the research, design, development, and testing of cardiovascular, structural heart, surgical, and mechanical circulatory support (MCS) devices. I currently have 21 issued U.S. patents for implantable cardiovascular devices and related surgical methods and have served as PI and Co-I on multiple Phase I and Phase II National Institutes of Health (NIH) Small Business Innovation and Research (SBIR) grant programs for the development and testing of cardiovascular therapies and devices. I have spent the majority of my career in the entrepreneurial space founding or working in/with small businesses to develop novel technologies through grant or private funding. I have extensive experience in mechanical and CAD design (SolidWorks), computational fluid dynamic (CFD) modeling, prototype fabrication, mock loop construction and testing, project leadership, and technical/grant writing.

Education

2015 - 2020

Ph.D. Doctor of Philosophy in Interdisciplinary Studies with a specialization in Translational Bioengineering

J.B. Speed School of Engineering, University of Louisville, Louisville, KY

2010 - 2011

MEng. Master of Engineering with a specialization in Mechanical Engineering

J.B. Speed School of Engineering, University of Louisville, Louisville, KY

2006 - 2010

B.S. Bachelor of Science in Mechanical Engineering

J.B. Speed School of Engineering, University of Louisville, Louisville, KY

Academic and Professional Experience

JAN. 2021 - PRESENT

Senior Engineer / Engineering Project Manager

Inspired Therapeutics, LLC, Merritt Island, FL

Manage the mechanical design, hydrodynamic, and hemodynamic performance of the *NeoMate Pediatric VAD* and *Universal Controller System*, a new MCS solution intended for short-term (up to 30 days) ventricular support (left and right), and cardiopulmonary support (ECMO, integrated respiratory assist, and cardiopulmonary bypass) for the pediatric population. Additionally, serve as Project Manager, coordinating development efforts between pump development, controller

development (electronics), motor development (MagLev), and research efforts with academic partners at the University of Louisville, Cardiovascular Innovation Institute.

AUG. 2020 - PRESENT

R&D Engineering Consultant

VADovations Inc., Oklahoma City, OK

Coordinating the development of concept, procedure, and preliminary prototyping for a new right-heart anchoring technology to couple with the VADovations VAD device for transcatheter delivery and implantation.

SEP. 2018 – JUN. 2022

Director of Engineering

Myocardial Assist Systems & Technology, LLC, Louisville, KY

Directed the development of two surgical tools to aid in the implantation of VADs: the *Uniti* sutureless anastomotic quick connect system and the *CardiAction* partial balloon occlusion device. The *Uniti* system is designed to facilitate minimally invasive, fast, and repeatable connection of VAD outflow grafts to the ascending aorta, a process which is still manually completed by surgeons. *CardiAction* is a transcatheter device consisting of a stent and proximal and distal balloons that can partially occlude a blood vessel internally and is intended to replace traditional external cross-clamping of the aorta during LVAD implantation. Both projects competed for and were awarded NIH SBIR Phase I grants to demonstrate the feasibility of each technology.

SEP. 2018 – SEP. 2020

Senior Biomedical Research Engineer (Contract)

Cor Habere Corp., Louisville, KY

Development of a novel Left Atrial Appendage (LAA) closure device (*StrokeShield*) that completely occludes and collapses the LAA to minimize the risk of stroke. Responsible for designing multiple iterations of the *StrokeShield* device as well as designing, fabricating, and testing a steerable catheter delivery tool to deliver the device via a femoral/transeptal approach.

AUG. 2015 – SEPT. 2018

Graduate Researcher

Advanced Heart Failure Research Group, Cardiovascular Innovation Institute, University of Louisville, Louisville, KY

Headed or aided in the *in vitro* (static and dynamic mock circulatory loops) and *in vivo* (acute and chronic large animal model studies) research and testing of multiple emerging cardiovascular and MCS devices from industry as part of the Advanced Heart Failure Research group located at the Cardiovascular Innovation Institute at the University of Louisville (Louisville, KY).

NOV. 2013 - MAY 2015

Director of Engineering

SCR Inc., Louisville, KY

Directed many medical and sports therapy device projects. Particularly, spearheaded the development of a novel catheter-based mitral annulus ring that allowed for the deployment of a

stent replacement valve. Led the development of this device from its infancy as a concept all the way to chronic animal studies. I, along with team members, designed and fabricated iterations of this device over the course of three years and tested them in cadaver models, in addition to acute and chronic large animal models. After completing multiple successful chronic large animal model studies, this technology was acquired by Edwards Lifesciences and is currently undergoing clinical evaluation as the Sapien M3 mitral system.

AUG. 2009 - NOV. 2013

Biomedical Engineer

SCR Inc., Louisville, KY

Among involvement in several projects, contributed to the ongoing development of a novel mechanical circulatory support system (*Symphony*, Abiomed, Danvers, MA) which provided long-term partial support for advanced heart failure patients. I collaborated in attaining and completing multiple Phase I and II NIH SBIR grants for the development of specific components of the device (Blood Pump, Pump Driver, EKG Timing System) as well as multiple state matching KSTC (Kentucky Science and Technology Corporation) grants. My specific contributions to these grants were designing, fabricating, and testing a bi-directional flow graft interface from the pump to the right subclavian artery; the first of its kind. Additionally, I aided in the design and development of the miniature driver unit for the pump as well as the subcutaneous EKG lead timing and signal processing system.

JAN. 2008 - AUG. 2009

Aircraft Performance Engineering Co-op

United Parcel Service, Airline Division, Louisville, KY

Co-op work study during undergraduate career. Performed multiple tasks in the Performance Engineering division over three separate semesters of study, responsible for aircraft weight and balance, route planning, and takeoff and landing procedures for the entire UPS international fleet (250+ commercial aircraft).

Awards and Recognition

UofL Doctoral Student Federal Funding Award	2021
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J.B. Speed School of Engineering, Department of Bioengineering

UofL Exemplary Doctoral Dissertation Award	2021
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J.B. Speed School of Engineering, Department of Bioengineering

UofL Doctoral Student Inventorship Award	2020
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J.B. Speed School of Engineering, Department of Bioengineering

UofL APPKI Doctoral Student Exemplary Achievement Award	2019
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For Exemplary Research Achievement in Bioengineering

ASAIOfyi Fellowship Award	2019
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Paul S. Malchesky Fund, ASAIO 65th Annual Conference, San Francisco, CA

ASAIO 7th Annual Medical Device Entrepreneur's Forum	2018
1st Place Presentation for Uniti Connect, ASAIO 64th Annual Conference, Washington, DC	
J.B. Speed School Outstanding Corporate Partner Award	2013
For Student Co-op Development and Mentorship, SCR Inc., Louisville, KY	
Eagle Scout	2005
BSA Troop 984, Boy Scouts of America	
Yarmuth Book Award	2005
UofL Academic Achievement Recognition	

Professional Affiliations

American Society of Artificial Internal Organs (ASAIO)	Member
ASAIOfyi for Young Innovators	Member
Biomedical Engineering Society (BMES)	Past-Member
American Heart Association (AHA)	Past-Member

Peer-Reviewed Publications

- 1) Monreal G., Koenig S. C., Slaughter M. S., Morello G. F., Prina S. R., [Tompkins L. H.](#), Huang J., Gellman B. N., Dasse K. A. (2022). Feasibility testing of the Inspired Therapeutics NeoMate Mechanical Circulatory Support System for neonates and infants. *PLOS ONE* 17(5): e0266822. <https://doi.org/10.1371/journal.pone.0266822>
- 2) [Tompkins L. H.](#), Gellman B. N., Prina S. R., Morello G. F., Roussel T., Kopechek J. A., Petit P. C., Slaughter M. S., Koenig S. C., Dasse K. A. (2022). Development of Inspired Therapeutics Pediatric VAD: Computational Analysis and Characterization of VAD V3. *Cardiovasc Eng Technol*. doi:10.1007/s13239-021-00602-2
- 3) [Tompkins L. H.](#), Prina S. R., Gellman B. N., Morello G. F., Roussel T., Kopechek J. A., Petit P. C., Slaughter M. S., Koenig S. C., Dasse K. A. (2021). Development of Inspired Therapeutics Pediatric VAD: Benchtop Evaluation of Impeller Performance and Torques for MagLev Motor Design. *Cardiovasc Eng Technol*. doi:10.1007/s13239-021-00578-z
- 4) Slaughter M.S., Monreal G., Koenig S.C., Giridharan G.A., [Tompkins L.H.](#), Jimenez J.H. (2021) Demonstration of proof-of-concept of StrokeShield system for complete closure and occlusion of the left atrial appendage for non-valvular atrial fibrillation therapy. *PLOS ONE* 16(6): e0253299. <https://doi.org/10.1371/journal.pone.0253299>

- 5) [Tompkins L. H.](#), Gellman B. N., Morello G. F., Prina S. R., Roussel T., Kopechek J. A., Petit P. C., Slaughter M. S., Koenig S. C., Dasse K. A. (2021). Design and Initial Computational Evaluation of a Pediatric MagLev Rotary Blood Pump. *ASAIO Journal* Sep;67(9):1026-1035. doi: 10.1097/mat.0000000000001323
- 6) Carnahan S. R., Koenig S. C., Sobieski M. A., Schumer E. M., Monreal G., Wang Y., Choi Y., Meuris B. J., [Tompkins L. H.](#), Wu Z. J., Slaughter M. S., Giridharan G.A. (2017). Efficacy of Subcutaneous Electrocardiogram Leads for Synchronous Timing During Chronic Counterpulsation Therapy. *ASAIO Journal*, 63(2), 134–138. doi:10.1097/MAT.0000000000000498
- 7) DuPont W. H., Meuris B. J., Hardesty V. H., Barnhart E. C., [Tompkins L. H.](#), Golden M. J. P., Usher C. J., Spence P. A., Caldwell L. K., Post E. M., Beeler M. K., Kraemer W. J. (2017). The Effects Combining Cryocompression Therapy following an Acute Bout of Resistance Exercise on Performance and Recovery. *Journal of Sports Science and Medicine*, 16(3):333-342.
- 8) Warren S., Giridharan G. A., Dowling R. D., Spence P. A., [Tompkins L.](#), Gratz E., Sherwood L. C., Sobieski M. A., Bartoli C. R., Slaughter M. S., Keynton R. S., Koenig S. C. (2012). Feasibility of Subcutaneous ECG leads for synchronized timing of a counterpulsation device. *Cardiovascular Engineering and Technology*, 3(1):17-25. <https://doi.org/10.1007/s13239-011-0074-2>

Peer-Reviewed Conference Abstracts

- 1) [Tompkins L.](#), Gellman B., Morello G., Prina S., Roussel T., Kopechek J., Williams S., Petit P., Slaughter M., Koenig S., Dasse K. Computational Analysis and Characterization Of Inspired Therapeutics Pediatric VAD V3, *ASAIO 66th Annual Conference*, Washington, D.C., (Virtual Conference), (2021).
- 2) [Tompkins L.](#), Gellman B., Adams T., Dasse K., Koenig S. Novel Centrifugal Impeller Design for a MagLev Pediatric Cardiac Assist Pump. *ASAIO 66th Annual Conference*, Chicago, IL, (Virtual Conference), (2020).
- 3) Wampler R., Hull B., Karlen J., [Tompkins L.](#), Adams T., Koenig S., Slaughter M. HVAD Intelligent Control for Dynamic Ventricular Unloading. *ASAIO 65th Annual Conference*, San Francisco, CA, (2019).
- 4) [Tompkins L.](#), Koenig S., Sobieski M., Koenig G., Adams T., Monreal G., Gellman B., Petit P., Dasse K., Slaughter M. Development of a Sutureless LVAD Outflow Graft Anastomotic Quick-connect system. *ASAIO 65th Annual Conference*, San Francisco, CA, (2019).
- 5) Giridharan G., Sobieski M., Monreal G., [Tompkins L.](#), Adams T., Schumer E., Whited W., Gallo M., Ising M., Jimenez J., Koenig S., Slaughter M. Left Atrial Appendage

(LAA) Device as A Non-Valvular Atrial Fibrillation (NVAf) Therapy. *Biomedical Engineering Society (BMES) 50th Annual Meeting*, Atlanta, GA, (2018).

- 6) Kanukunta A., Slaughter M., [Tompkins L.](#), Adams T., Sobieski M., Koenig S., Joly J., Bourge R. Artifact in Pressure Measurement with Pulmonary Artery Pressure Catheters. *Biomedical Engineering Society (BMES) 50th Annual Meeting*, Atlanta, GA, (2018).
- 7) Tapolsky N. R., [Tompkins L. H.](#), Smith C. J., Ebersold N. R., Sobieski M. A., Monreal G., Polverelli L., Monticone P., Botterbusch C., Slaughter M. S., Koenig S. C. In vitro Performance of a Novel Membrane-oscillating Left Ventricular Assist Device. *ASAIO 63rd Annual Conference*, Chicago, IL, (2017).
- 8) Dowling R., Spence P., Warren S., [Tompkins L.](#), Sandoval M., Giridharan G., Sherwood L., Gratz E., Spanier G., Lederer C., Bruck S., Slaughter M., Koenig S. Development of a Long-Term Superficial Device for Partial Circulatory Support. *Heart Failure Society of America (HFSA) 15th Annual Scientific Meeting*, Boston, MA, (2011).

Conference Presentations

- 1) [Tompkins L. H.](#) Computational Analysis and Characterization Of Inspired Therapeutics Pediatric VAD V3. *ASAIO 66th Annual Conference*, Washington, D.C., (Virtual Conference), (2021).
- 2) [Tompkins L. H.](#) Novel Centrifugal Impeller Design for a MagLev Pediatric Cardiac Assist Pump. *ASAIO 66th Annual Conference*, Chicago, IL, (Virtual Conference), (2020).
- 3) [Tompkins L. H.](#) Development of a Sutureless LVAD Outflow Graft Anastomotic Quick-connect system. *ASAIO 65th Annual Conference*, San Francisco, CA, (2019).
- 4) [Tompkins L. H.](#) Uniti Connect: Sutureless Anastomotic System. 7th Annual Medical Device Entrepreneur's Forum, *ASAIO 64th Annual Conference*, Washington, D.C., (2018).

Invited Talks

- 1) [Tompkins L. H.](#) Design and CFD Analysis of a Pediatric Magnetically Levitated Blood Pump. *UofL Bioengineering Department Seminar Series*, Louisville, KY, Feb. 26, 2020.
- 2) [Tompkins L. H.](#) Simple Ideas: Designing and Developing Medical Devices. *UofL Bioengineering Department Seminar Series*, Louisville, KY, Nov. 6, 2018.

Dissertation

- 1) [Tompkins L.H.](#) "Development of a Pediatric cardiac assist Maglev pump for use with a universal driver system." (December 2020). *Ph.D. Dissertation*, University of Louisville (Chair: Dr. Steven Koenig), <https://ir.library.louisville.edu/etd/3542>

Patents (Issued)

- 1) Spence P.A., [Tompkins L.](#), *Mitral repair and replacement devices and methods*, US Patent US 11406493 filed May 2020, Issued August 2022.
- 2) Spence P.A., [Tompkins L.](#), *Valve docking devices, systems and methods*, US Patent US11376124 filed March 2019, Issued July 2022.
- 3) Spence P.A., [Tompkins L.](#), Chau, M., Siegel, A. *Replacement heart valve methods*, US Patent US11304797 filed February 2019, Issued April 2022.
- 4) Spence P.A., [Tompkins L.](#), Chau, M., Siegel, A. *Replacement heart valve systems and methods*, US Patent US11234811 filed February 2019, Issued February 2022.
- 5) Spence P.A., [Tompkins L.](#) *Replacement heart valve systems and methods*, US Patent US11229515 filed February 2019, Issued January 2022.
- 6) Spence P.A., [Tompkins L.](#) *Valve docking devices, systems and methods*, US Patent US11166812 filed March 2019, Issued November 2021.
- 7) Spence P.A., [Tompkins L.](#) *Apparatus and methods for implanting a replacement heart valve*, US Patent US10945837 filed May 2018, Issued March 2021.
- 8) Spence P.A., [Tompkins L.](#) *Devices, systems and methods for delivering a prosthetic mitral valve and anchoring device*, US Patent US10898320 filed August 2018, Issued January 2021.
- 9) Spence P.A., [Tompkins L.](#) and Acland, R. *Apparatus and methods for cutting an atrial wall*, US Patent US10660669 filed October 2017, Issued May 2020.
- 10) Spence P.A., [Tompkins L.](#) *Mitral repair and replacement devices and methods*, US Patent US10653519 filed July 2018, Issued May 2020.
- 11) Chau M., Siegel A., Spence P.A., [Tompkins L.](#) *Coiled anchor for supporting prosthetic heart valve, prosthetic heart valve, and deployment device*, US Patent US10588742 filed March 2018, Issued March 2020.
- 12) Spence P.A., [Tompkins L.](#) *Mitral valve docking devices, systems and methods*, US Patent US10226339 filed January 2013, Issued March 2019.
- 13) Spence P.A., [Tompkins L.](#), Chau, M., Siegel, A. *Replacement heart valve apparatus and methods*, US Patent US10226330 filed August 2014, Issued March 2019.

- 14) Spence P.A., [Tompkins L.](#) *Devices, systems and methods for delivering a prosthetic mitral valve and anchoring device*, US Patent US 10052199 filed February 2015, Issued August 2018.
- 15) Chau M., Siegel A., Spence P.A., [Tompkins L.](#) *Coiled anchor for supporting prosthetic heart valve, prosthetic heart valve, and deployment device*, US Patent US10052198 filed February 2015, Issued August 2018.
- 16) Spence P.A., [Tompkins L.](#) *Apparatus and methods for implanting a replacement heart valve*, US Patent US10034749 filed August 2014, Issued July 2018.
- 17) Spence P.A., [Tompkins L.](#) *Mitral repair and replacement devices and methods*, US Patent US10016272 filed September 2015, Issued July 2018.
- 18) Spence P.A., [Tompkins L.](#) and Acland, R. *Apparatus and methods for cutting an atrial wall*, US Patent US9808283 filed December 2014, Issued November 2017.
- 19) Spence P.A., Warren S.P., Wells E.J., Dierking W.K., Bachman D.R., and [Tompkins L.](#) *Systems and methods for treating the heart with ablation*, US Patent US9713495 filed November 2015, Issued July 2017.
- 20) Spence P.A., Warren S.P., Wells E.J., Dierking W.K., Bachman D.R., and [Tompkins L.](#) *Systems and methods for treating the heart with ablation*, US Patent US9504523 filed August 2012, Issued November 2016.
- 21) Spence P.A., Warren S.P., Wells E.J., Dierking W.K., Bachman D.R., and [Tompkins L.](#) *Systems, devices and methods for treating the heart with ablation*, US Patent US9216055 filed August 2010, Issued December 2015.

Patents (Applications)

- 1) [Tompkins L.](#), Sobieski M., Koenig S., Monreal G., Slaughter M. *Sutureless Graft Anastomotic Quick Connect System*, US Patent App. A1 20210052272 (published Feb 2021, Patent pending)
- 2) [Tompkins L.](#), Koenig S., Monreal G., Slaughter M., F. Mayhaus, Buckley C., Adams A., Sager V. *Partial Vessel Occlusion Device*, PCT International Patent Application PCT/US2020/031751 (filed May 2020, Patent pending)
- 3) [Tompkins L.](#), Koenig G., Dasse K., Gellman B., Koenig S., Slaughter M. *Sutureless Graft Anastomotic Quick Connect System with Variable Adjustment*, US Provisional Patent Application 64/866,886 (filed June 2019, Patent pending)
- 4) [Tompkins L.](#), Koenig S., Monreal G., Slaughter M., Mayhaus F., Buckley C., Adams A., Sager V. *Development of a Partial Occlusion Device to Aid in Coring and Anastomosis of the Aorta*, US Provisional Patent Application 62/846,210 (filed May 2019, Patent pending)

- 5) [Tompkins L.](#), Sobieski M., Koenig S., Monreal G., Slaughter M. *Sutureless Graft Anastomotic Quick Connect System*, PCT International Patent Application PCT/US2019/016285 (filed February 2019, Patent pending)
- 6) [Tompkins L.](#), Sobieski M., Koenig S., Monreal G., Slaughter M. *Sutureless Graft Anastomotic Quick Connect System*, US Provisional Patent Application 62/625,635 (filed February 2018, Patent pending)
- 7) Spence P.A., [Tompkins L.](#), Walling S.C., Hatton R.D., Hutzenlaub J., Spence W., Singer A. *Athletic cooling and heating systems, devices and methods*, US Patent App. 15/248,674 filed August 2016. Patent Pending
- 8) Spence P.A., [Tompkins L.](#), Walling S.C., Hatton R.D., Hutzenlaub J., Spence W., Singer A. *Athletic cooling and heating systems, devices and methods*, US Patent App. 14/127,054 filed July 2012. Patent Pending

Research Disclosures

- 1) [Tompkins L.](#), Sobieski M., Koenig S., Monreal G., Slaughter M. *Development of a sutureless graft anastomotic quick-connect system*, UofL Research Disclosure RDF 20079 (submitted June 2020)
- 2) [Tompkins L.](#), Koenig S., Monreal G., Slaughter M., F. Mayhaus, Buckley C., Adams A., Sager V. *Development of a Partial Occlusion Device to Aid in Coring and Anastomosis of the Aorta*, UofL Research Disclosure RDF 19030 (submitted Sep 2018)
- 3) [Tompkins L.](#), Sobieski M., Koenig S., Monreal G., Slaughter M. *Development of a sutureless LVAD outflow graft anastomotic quick-connect system*, UofL Research Disclosure RDF 18041 (submitted Dec 2017)

Funded Grants

R43HL152894-01 ([PI MAST: Tompkins](#), co-PI UofL: Koenig, Slaughter)

8/21/2020 – 9/20/2022

\$278,487

NIH SBIR phase I Grant (MAST, Louisville KY)

Development of a partial occlusion device to aid coring and anastomosis of the aorta

The major goal of this project is to demonstrate feasibility of a partial occlusion device (*CardiAction*) to facilitate minimally invasive surgery for implant of mechanical circulatory support (MCS) devices.

Role: [Principal Investigator](#)

R43HL142385-01 (co-PI MAST: [Tompkins](#), Dasse, co-PI UofL: Koenig, Slaughter)
9/24/2018 – 2/28/2022 \$303,817
NIH SBIR phase I Grant (MAST, Louisville, KY)
Development of a sutureless LVAD outflow graft anastomotic quick-connect system
The major goal of this project is to demonstrate feasibility of a sutureless graft to aorta anastomotic device (*Uniti Connect*) to facilitate minimally invasive implantation of mechanical circulatory support (MCS) devices.
Role: [Principal Investigator](#)

R43HL142337-01 (PI CH: Jimenez, co-PI UofL: Koenig, Slaughter)
9/24/2018 – 2/28/2022 \$311,131
NIH SBIR phase I Grant (Cor Habere, Louisville, KY)
Left Atrial Appendage (LAA) closure device for stroke prevention in patients with AFIB
The major goal of this project is to complete pre-clinical development of a left atrial appendage (LAA) closure device (*StrokeShield*) designed to prevent strokes in patients with atrial fibrillation (AFIB).
Role: [Cor Habere Engineer](#)

R43HL144214-01 (PI IT: Dasse, co-PI UofL: Koenig, Slaughter)
7/1/2018 – 6/30/2021 \$415,921
NIH SBIR phase I Grant (Inspired Therapeutics, Merritt Island, FL)
Development of a universal maglev driver for five pediatric cardiac and respiratory applications
The major goal of this project is to demonstrate feasibility of pediatric Universal MagLev system designed to provide up to 30-days of mechanical circulatory support (MCS) as left ventricular assist device (LVAD).
Role: [Doctoral Student Researcher](#)

R44HL123120-01 (PI: Spence)
05/01/2014 – 04/30/2015 \$320,765

NIH SBIR Phase I & II Fast Track (SCR Inc., Louisville, KY)

Development of SVAD System for HF Therapy

The objective of this proposal was to complete the engineering development and pre-clinical testing of the SVAD system (SCR, Louisville, KY & Heartware Inc., Framingham, MA) to provide partial cardiac assist in patients with less advanced stage heart failure (HF).

Role: [Co-Investigator](#)

KSTC-184-512-13-153 (PI: Spence)

01/01/2013 – 12/31/2015

Kentucky Science and Technology Corporation (KSTC) Grant (SCR Inc., Louisville, KY)

Counterpulsation device with integrated ECG sensing

The major goal of this proposal was to complete development of the *Symphony* system (Abiomed, Danvers, MA) by integrating a subcutaneous lead system for ECG detection, signal conditioning, and control.

Role: [Co-Investigator](#)

2R43HL102981-02A (PI: Spence)

04/01/2012 – 03/31/2014

\$1,616,503

NIH SBIR Phase II grant (SCR Inc., Louisville, KY)

Subcutaneous ECG Sensing

The major goal of this project was to complete development of novel subcutaneous ECG leads integrated with the *Symphony* device (Abiomed, Danvers, MA) and portable driver.

Role: [SCR Engineer](#)

2R44HL088760-02 (PI: Spence)

05/15/2009 – 04/12/2012

\$1,580,486

NIH SBIR Phase II Grant (SCR Inc., Louisville, KY)

Portable pneumatic driver for counterpulsation therapy

The major goals of this project were to (1) complete engineering development, (2) demonstrate reliability and hemocompatibility, and (3) demonstrate safety and

biocompatibility of a portable pneumatic driver for a novel counterpulsation device (CPD) to treat early stage heart failure.

Role: [SCR Engineer](#)

2R44HL083586-02A1 (PI: Spence)

08/01/2008 – 07/31/2011

\$1,440,170

NIH SBIR Phase II Grant (SCR Inc., Louisville, KY)

Development of a Counterpulsation Therapy Device

The major goals of this project were to (1) complete engineering development and surgical procedures, (2) demonstrate reliability and hemocompatibility, and (3) demonstrate safety and biocompatibility of a novel counterpulsation device (CPD) to treat early stage heart failure.

Role: [SCR Engineer](#)

R43HL102981 (PI: Spence)

03/01/2010 – 02/28/2011

\$244,850

NIH SBIR Phase I Grant (SCR Inc., Louisville, KY)

Subcutaneous ECG Sensing

The major goal of this project was to demonstrate feasibility of a novel subcutaneous ECG to be integrated with the *Symphony* device and portable driver.

Role: [SCR Engineer](#)

Teaching Activities

[Instructor](#)

Spring 2022

EE 0350 Honors Biomedical Engineering

North Carolina School of Science and Mathematics, Distance Learning

[Doctoral Teaching Practicum \(Instructor\)](#)

Spring 2018

BE 480 Medical Device Design

University of Louisville, Department of Bioengineering

[Course Co-instructor](#)

Spring 2016 - 17

BE 480 Medical Device Design

University of Louisville, Department of Bioengineering

Mentored Students / Co-ops / Interns

Name	Role	Current Position
1) Nidhi Kalia	Undergraduate student in Biomedical Engineering, Rensselaer Polytechnic Institute (Research Internship Advisor, MAST LLC, 2021)	
2) George Koenig	Graduate student in Mechanical Engineering, University of Louisville (Independent Study, Research Advisor, MAST LLC, 2019)	Mechanical Engineer, <i>VentriFlo, Pelham, NH</i>
3) Francesca Mayhaus	Undergraduate student in Bioengineering, University of Louisville (Senior Capstone Project Mentor, MAST LLC, 2018) Graduate student in Bioengineering, University of Louisville (Master's Research Project Advisor, MAST LLC, 2019)	Associate Design Engineer, <i>Ethicon Inc., Cincinnati, OH</i>
4) Victoria Sager	Undergraduate student in Bioengineering, University of Louisville (Senior Capstone Project Mentor, MAST LLC, 2018) Graduate student in Bioengineering, University of Louisville (Master's Research Project Advisor, MAST LLC, 2019)	Design Quality Engineer II, <i>DePuy Synthes Companies, Boston, MA</i>
5) Christian Buckley	Undergraduate student in Bioengineering, University of Louisville (Senior Capstone Project Mentor, MAST LLC, 2018)	
6) Adrian Adams	Undergraduate student in Bioengineering, University of Louisville (Senior Capstone Project Mentor, MAST LLC, 2018)	
7) Chelsea Lancaster	Undergraduate student in Bioengineering, University of Louisville (Co-op Advisor, UofL CII AHFR Lab, 2017 - 2019)	Medical Student at University of Louisville School of Medicine (Class of 2023)
8) Jake Karlen	Undergraduate student in Bioengineering, University of Louisville (Co-op Advisor, UofL CII AHFR Lab, 2016 - 2018)	Clinical Specialist – Cardiac Rhythm Management, <i>Medtronic, Louisville, KY</i>

9) Nathalie Tapolsky	Undergraduate student in Bioengineering, University of Louisville (Mentor, UofL CII AHFR Lab research, 2016 - 2018)	R&D Research Assistant <i>CorWave, Clichy, France</i>
10) Abhinav Kanukunta	Undergraduate student in Bioengineering, University of Louisville (Mentor, UofL CII AHFR Lab research, 2016 - 2018)	Laboratory Technologist II, <i>Gravity Diagnostics, Covington, KY</i>
11) Connor Smith	Undergraduate student in Bioengineering, University of Louisville (Mentor, UofL CII AHFR Lab research, 2016 - 2018)	Medical Student at University of Louisville School of Medicine (Class of 2022)
12) Clayton Usher	Undergraduate student in Bioengineering, University of Louisville (Co-op Advisor, SCR Inc., 2013 - 2014)	Sales Engineer, <i>DAFA Group, Chicago, IL</i>
13) Jordan Fite	Undergraduate student in Bioengineering, University of Louisville (Co-op Advisor, SCR Inc., 2012 -2014)	Product Development Engineer 1, <i>Freudenberg Medical, Louisville, KY</i>
14) Dr. Sam Walling	Undergraduate student in Biomedical Engineering, Vanderbilt University (Summer Internship Advisor, SCR Inc., 2011 - 2014)	Resident Physician in General Surgery, <i>University of Kentucky Chandler Medical Center, Lexington, KY</i>
15) Alex Singer	Undergraduate student in Mechanical Engineering, University of Louisville (Co-op Advisor, SCR Inc., 2011 - 2012)	Mechanical Engineer, <i>C&I Engineering Inc., Louisville, KY</i>
16) Melissa Sandoval	Undergraduate student in Bioengineering, University of Louisville (Co-op Advisor, SCR Inc., 2011)	Project Manager, <i>Argon Medical Devices Inc., Athens, TX</i>