

Clemson University Department of Bioengineering

RESUME BOOK

Fall 2015 Class of Master of Engineering in Biomedical Engineering Students

Fall 2015 Version

Contact:

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www.clemson.edu/ces/bioe

At Clemson

Department of Bioengineering 301 Rhodes Research Center Clemson University Clemson, SC 29634-0905

At MUSC

Clemson-MUSC Joint Bioengineering Program Medical University of South Carolina 68 President Street – BE 101D – MSC 501 Charleston, SC 29425









Training the next generation of thinkers, leaders and entrepreneurs.

About us:

Clemson University's Department of Bioengineering has been widely recognized as a pioneer in the field of biomaterials science and engineering and is renowned for its leadership in biomaterials research and education. One of the oldest in the world, Clemson's bioengineering program began in 1963 with the inception of a Doctor of Philosophy. A Master of Science was added in 1966, a Bachelor of Science in 2006 and most recently, the M. Eng. in Biomedical Engineering began in 2014.

Clemson University is also known as the international birthplace of the field of biomaterials, the building blocks of medical devices. The Society For Biomaterials (SFB), which is the premier professional society in the field of bioengineering, began at Clemson in 1974.

The Department of Bioengineering has experienced unprecedented growth in faculty, personnel, facilities and programs. Clemson has strengthened its commitment to provide a unique learning environment to students and scientists-in-training by integrating state-of-the-art research with education in cardiovascular devices and implantology, orthopaedic materials, tissue engineering, hybrid systems, biophotonics, nanoscale biointerfaces, biomolecular simulations, dental biomaterials, mechanobiology and many other emerging technologies.

In 2011, the Clemson University Biomedical Engineering Innovation Center, CUBEInC, was opened at the Patewood campus of the Greenville Health System. Combining basic research labs, a medical skillslab and technology incubator space, CUBEInC provides a unique platform for Clemson faculty and students to develop high-impact medical technology and devices, and to transfer research and engineering to clinical applications.

<u>Degress Offered</u>: BS (bioelectrical or biomaterials), BS/MS, MEng., MS, PhD



Contents

2015 December Graduates

Wesley Froehlich

2016 Graduates

Kelsey Baird

Anna Cantrell

Chadd Clark

Ian Forbes

Nicholas Freeman

Megan Hanschke

Jon Lepage

Adam Marrocco

Andrew Mlynarczyk

Evan Robinson

George Seignious

Rebecca Thomas

Wesley Froehlich

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Vanguard.w@gmail.com

Education:

Department of Bioengineering

Clemson University

Masters of Engineering in Biomedical Engineering

August 2014 - December 2015

College of Science and Engineering University of Minnesota, Twin Cities

Bachelor of Science, Biomedical Engineering

September 2006 - May 2010

- Emphasis in Bioelectromagnetism & Bioinstrumentation
- GPA: 3.452

Skills:

- Medical device design, prototyping, regulations and commercialization
- Digital signal processing and electronics
- Software design and programming
- Project management

Work Experience:

<u>Technical Services</u> Epic Systems July 2010 - July 2014

- Built and maintained support relationships with more than six clients including Kaiser Permanente, Sisters of Mercy, Lee Memorial Health systems, and Wenatchee Valley Medical Center.
- Supported client installs and transition to full software integration.
- Investigated, identified root causes, and developed solutions for complex issues.

Research Experience:

Research Assistant University of Macau, Macau SAR, China June 2009 - August 2009

- Designed experiments to aid in the development of an electrical model of the human forearm.
- Studied signal transduction in mammalian tissues for device communication through organic mediums.
- Collaborated closely with multiple universities in China to assimilate research.

Research Assistant University of Minnesota June 2009 - August 2009

- Collaborated with Dr. Simone and Dr. Kennedy to analyze and test a device for early diagnosis of neuropathy in diagnosed and undiagnosed diabetes patients. The device was used as an early detection method as well as a practical means for monitoring the progression of nerve damage.
- Received training on nanotechnology laboratory equipment to fabricate nanostructures for tactile detection.
- Received Undergraduate Research Opportunity Program (UROP) grant.

Research Assistant University of Minnesota January 2007-August 2007

- Analyzed data from MINOS neutrino detector arising from high energy collisions.
- Received Undergraduate Research Opportunity Program (UROP) grant.

Kelsey L. Baird

25 Maverick Drive • Pendleton, SC 29670 • 864-430-9262 • klbaird@clemson.edu

EDUCATION

Clemson University

Masters of Engineering, Biomedical Engineering Fall 2015- Present

Anticipated graduation: December 2016

Bachelors of Science, Bioengineering; GPA: 3.67 Fall 2012- Present

Major GPA: 4.0

PROJECT DESIGN EXPERIENCE - MEDICAL DEVICE

Masters Level Medical Device Design Innovation course creating revolutionary suture anchor system for soft tissue fixation

- Leading and organizing key opinion design reviews with Orthopedic Surgeons
- Researching technical design and prototyping, international regulatory filling, manufacturing and process planning

Develop prototype hip orthotic - Undergraduate Biomedical Design project assisting patients with upper motor neuron damage

 Medical device design processes including DHF documentation, FDA regulatory pathways, prototype design and conducting design phase gate meetings

WORK EXPERIENCE

NASA Research Intern

May 2014-July 2014

Medical University of South Carolina. Charleston, SC

- Palmetto Academy program at MUSC, researching the detrimental effects of spaceflight on human tissue
- Culturing cells in microgravity simulating bioreactor and determining gene and protein expression of key signaling molecules responsible for bone mass loss in space environment

Entrepreneur / Partner

May 2009- Present

- ${\bf Friesian\ Marketplace,\ Greer,\ SC}$
 - Partner of successful start-up specializing in importing, development and sales of specialty horses, \$600,000 + yearly revenue
 - Digital content marketing web design, promotional videos, SEO optimization
 - International business development, primarily European counterparts
 - Successful equestrian competitor in numerous domestic and international performances, winning over ten world championship titles
 - Extensive customer relations, staff management and small business execution

SKILLS

- Solidworks
- Microsoft Office Suite
- Aseptic Cell Culture Techniques
- RT-PCR Analysis
- Western Blot Analysis

- SEO Optimization
- Interacting with Clinical Collaborators
- Video Editing
- MATLAB
- HTML Codin

AWARDS

- President's List Clemson University
- Palmetto Fellows Scholarship Recipient Palmetto Pact Scholarship Recipient

ANNA CANTRELL

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EDUCATION

Master of Engineering in Biomedical Engineering

Clemson University, Clemson, SC

Expected to Graduate in August 2016

Bachelor of Science in Bioengineering

Clemson University, Clemson, SC

3.1 GPA

RELATED SKILLS AND COURSEWORK

Biomaterials Cardiovascular Engineering Intro to Electrical Engineering Medical Device Commercialization

Bioinstrumentation Biopharm. Engineering Intro to Materials Science Bioengineered Replacements

Biochemistry Tissue Engineering Materials Processing MATLAB

RELATED EXPERIENCE

BioE Device Design Innovation

Fall 2015

AnchorFix - Team: Angor Medical

- Working on a team to apply concepts and techniques that underlie the medical device design and product development process on an assigned device
- AnchorFix is a novel knotless bone suture anchor that our team intends improve
- Held KOL (key opinion leader) meetings to get feedback on the design from orthopaedic surgeons

Bioengineering Senior Design

Fall 2014 - Spring 2015

ULTRASPIRE - Team Aspire

- Worked on a team to create a fine-needle aspiration and ultrasound coupling device
- Applied fundamental design theory principles and undergraduate bioengineering course content towards a final tested prototype
- Frequently met with an ENT surgeon mentor and attended bi-weekly gate meetings to discuss progress of design with faculty and graduate student advisors

Undergraduate Research Assistant

Spring 2015

Biocompatibility and Tissue Regeneration Laboratories, Clemson University

• Performed sectioning and histology staining on diabetic rat hearts

WORK AND VOLUNTEER EXPERIENCE

Spartanburg Regional Hospital

Summer 2015

Pre-op Center Volunteer

Fuddruckers Summer 2014

Guest Service Associate

Petsmart - Pet's Hotel, Greenville, SC

Summer 2012-2013

Pet Care Associate

HONORS, ACTIVITIES, AND SOCIETIES

Student Member of BMES

Recipient of the Palmetto Fellows Scholarship

Clemson University Marching Band (Piccolo)

Music: player of *Piano and Flute*

May 2015

Chadd A. Clark

chaddc@clemson.edu (843) 408-5996

• 2319 Furman Dr. • Charleston • South Carolina 29414

Education

Masters of Engineering in Biomedical Engineering

May 2016

Clemson University

Clemson, SC

Medical Device Technology Entrepreneurship Certificate

Bachelor of Science in Bioengineering

May 2015

Clemson University

Clemson, SC

Concentration: Biomaterials Engineering

(3.85/4.00 GPA)

Related Medical Device Design Engineering Experience

Biomedical Engineering Device Design Innovation and Translation Project

Fall 2015-Spring 2016

Clemson University Department of Bioengineering

Clemson, SC

Clemson, SC

• Applies fundamental engineering design principles, employs documentation and medical device regulation, integrates customer feedback in design implementation along with translational and scale up processes to improve upon medical device prototype design.

Senior Design Capstone Project

Fall 2014-Spring 2015

Orion Balloon Angioplasty and Drug Delivery System
Led a team of bioengineers in design conception generation and won first place in the

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 Led a team of bloengineers in design conception generation and w Clemson Bioengineering Design Symposium.

• Built physical prototypes, justified design decisions in phase gate meetings, designed and completed verification and validation testing.

- Maintained a design history file and proper design documentation, including relevant information regarding applicable ISO standards, FDA guidance documentation, reimbursement strategy, and design controls.
- Served as team liaison between outsource manufacturing and industry contacts.

Design Assistant Fall 2014

Departmental Honors Project Clemson University – Dr. Martine LaBerge

Clemson, SC

• Collaborated with a small group of bioengineers to design and build a dynamic flow model artery simulator to test the efficacy of drug coated angioplasty balloons.

Clinical Internship Observer

Summer 2013

Roper St. Francis Hospital- Orthopedic and Sports Medicine

Charleston SC

• Shadowed and observed three orthopedic surgeons, spending approximately 70 hours in clinic and 25 hours in the operating room observing total knee replacement, total hip replacement, and various arthroscopic procedures of the knee, hip, and shoulder.

Research and Technical Experience

Graduate Teaching Assistant - Human Functional Anatomy

Fall 2015-Spring 2016

Clemson University Department of Biology

Clemson, SC

• Planned and taught hands-on cadaveric labs, formulated lab practicals, and assessed student progress

Research Assistant May-December 2014

Medical University of South Carolina - Department of Cardiology

Charleston, SC

- The goal of the research was to investigate certain morphologies within the extracellular matrix of transgenic mice within the physiological degradation pathways seen in chronic heart failure.
- Applied skills of animal handling and dissection, mechanical testing of tissues, data collection and analysis, statistics, and developed PowerPoint data summary presentations.

Other Professional Experience

Field Engineer Intern

Summer 2015 Roanoke, VA

Turner Long Construction

• On-site submittal review and turnover documentation, quality control, and safety assurance

Clubhouse Landscape Manager, Carpentry and Mechanical Assistant

Summer 2012 Charleston, SC

The Links at Stono Ferry Golf Course

 Worked and managed small teams of workers performing various tasks at the clubhouse and around the golf course. Designed and constructed a privacy fence and assisted in maintenance of large machinery.

Related Skills

Solidworks (3D Modeling), Matlab – Basic Programming, Chemical Analysis Testing, Mechanical material Testing, Cell Culture, CITI certified animal studies, FDA Regulatory and Coding, Microsoft Office, carpentry and woodworking

Achievements

- President's List
 - Fall 2012, Spring 2014, Fall 2014
- Dean's List
 - Fall 2011, Spring 2012, Spring 2013, Fall 2013, Fall 2014
- Tau Beta Pi Honors Engineering Society
- Valedictorian of West Ashley High School 2011

Activities

- Undergraduate Clemson Bioengineering Society
- Clemson Executive Opportunity
- Intramural Sports
 - basketball, softball, ultimate Frisbee, soccer
- Hobbies
 - Carpentry, woodworking and furniture, golf

Ian Forbes

Current Address: 318 N Clemson Ave Clemson SC, 29632 (540)-521-7687 iforbes@g.clemson.edu Permanent Address: 1606 Sunberry Circle Roanoke VA, 24018 ipforbz@gmail.com

Education:

Clemson University
Masters of Engineering in Biomedical Engineering
Bachelor of Science in Bioengineering
Concentration in Biomaterials

Expected May 2016 May 2015

3.92/4.00

Experience:

Clemson University Masters Project

August 2015 – Present

- Interacted with industry experts to further design knowledge
- Began refinement work on previously developed medical device
- Began work to develop regulatory application in EU for medical device

Clemson University Capstone Project with Greenville Health System

August 2014 - May 2015

- Interacted with clinical contacts in a "needs-finding" setting
- Designed a device that addressed a clinical need
- Interacted with FDA to develop a regulatory plan for device
- Designed commercialization plan through contact with local businesses

Clemson University: Campus Activities and Events

May 2014 – Present

- Interacted closely with clients to ensure smooth operation of planned events
- Aided in organization and day to day operation of concert/event venues

Relevant Skills:

- Clinical Interaction experienced in needs finding, as well as setting up and leading KOL meetings
- Design Software Proficiency certified in SolidWorks, proficient in MatLab
- Experience culturing cells and experience differentiating stem cells
- Design Experience ability to develop regulatory and commercialization strategies as well as failure mode analysis for a medical device

Awards/Honors:

- Alpha Eta Mu Beta National Biomedical Engineering Honor Society
- Graduated Magna Cum Laude

JON LEPAGE

15 Flat Shoals Ct Simpsonville, SC 29680 843-534-8547 jlepage@clemson.edu

EDUCATION

2015 – Present Masters of Engineering in Biomedical Engineering

Clemson University, Clemson, South Carolina

2015 Engineer in Training (EIT) Certification

National Council of Examiners for Engineering and Surveying

2010 – 2014 Bachelor's of Science Bioengineering

Concentration in Biomaterials, GPA: 3.4 Clemson University, Clemson, South Carolina

RELATED EXPERIENCE

Fall 2015- Present M.Eng DESIGN PROJECT

Sognapedics Soft Tissue Stiffness Gauge

- Engineer KOL meetings and surveying
- Iteratively improving prototype to a market ready device
- Lead phase-gate meetings with 'executive committee'
- Prepare U.S. FDA filling

Fall 2014-Spring 2015 SENIOR DESIGN PROJECT

PowerPaw Grip Strength Trainer & Tracker

- Learned principles of biomedical design
- Worked with clinicians to define a need
- Worked as a team to complete a design cycle
- Developed a working prototype
- Examined ASTM & ISO Standards and performed Verification & Validation

WORK EXPERIENCE

Summer 2014 L&L Equipment, Quebec, Canada

Agricultural Equipment Sales and Transportation

- Found logistic solutions for transporting equipment
- Coordinated with agricultural professionals to provide solutions to customer needs

Summer 2012 **The Home Depot**

Sales Associate (Lumber Department)

- Assisted customers and contractors at finding their project needs
- Kept merchandise pricing and availability up to date

Summer 2011 **The Home Depot**

Lot Associate

- Kept the parking lot clean and safe for the customers
- Greeted customers as they arrive and ensure they are satisfied as they leave
- Helped load merchandise for customers in a safe, controlled manner

SKILLS AND RELEVANT COURSE WORK

- Solidworks
- Labview
- Biomechanics
- Medical Device Design
- Biomaterials
- Database/Search Engines
- Orthopaedics
- Medical Imaging

- Matlab
- Commercialization
- Drug Delivery
- Instrumentation

HONORS AND ACTIVITIES

- President's List 2010 and 2011 semesters
- Dean's List all semesters

- Member of BMES
- Member of NSCS

Adam Marrocco

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EDUCATION:

Master of Engineering, Biomedical Engineering

Clemson University, Clemson, SC

Expected May 2016 GPA: 4.0/4.0

Bachelor of Science, Bioengineering

Clemson University, Clemson, SC

Concentration: Biomaterials

May 2015 GPA: 3.78/4.0

Relevant Coursework: Biomaterials, Biomechanics, Medical Device Commercialization, Orthopaedics Engineering, Cardiovascular Engineering, Drug Delivery, Tissue Engineering, Thermodynamics

SKILLS:

Certified SolidWorks Associate, Finite Element Analysis, Matlab, Maple, Visual Basic, Decellularization techniques, Microsoft Office

RELEVENT EXPERIENCE:

CUBEInC, Greenville, SC

August 2015-Present

Graduate Student Design Innovation Engineer - Conventus

- Improving upon the design of a provisionally-patented medical device to obtain a utility patent
- Organize and perform key opinion leader meetings with practicing orthopaedic surgeons through the Greenville Health System to gain clinical feedback
- Complete block assignments related to the design, regulatory process, manufacturing process, and sterilization of the device to be turned into an advisor

Department of Bioengineering, Clemson, SC

August 2014-May 2015

Senior Design Project - Tunneled Catheter Discharger

- Collaborated with a Vascular Surgeon and PA to perform needs finding
- Worked on a design team to create a clinically relevant device in the vascular market through the development, construction, and evaluation of our design
- Presented to a team of mentors, consisting of Professors and Graduate students, on a consistent basis
- Served as team leader in charge of creating and developing design using SolidWorks
- Device expected to earn IP protection within a year, as determined by technology committee

OrthO X Lab, Clemson University, Clemson, SC

January-August 2014

Creative Inquiry Team Member - Engineering the Intervertebral Disc (IVD)

- Worked to develop a biomimetic scaffold that can be used to tissue engineer an entire disc
- Performed literature review, harvest and storage of bovine IVDs, working in a group, hands-on experimentation, and presentation of findings
- Experimented to find effective means of decellularizing IVD tissue while keeping desirable extracellular matrix components
- Performed data analysis through Biochemical testing

WORK EXPERIENCE:

Team Member, Moe's Southwest Grill, Clemson, SC

May 2014-August 2015

- Followed procedures for safe preparation, handling, and serving of food
- Provided high standards of customer service in fast-paced environment

Landscaper, Lawn Maintenance, Indian Trail, NC

May-August 2012

• Performed a wide variety of lawn services to homes and neighborhoods

Personal Assistant, CIS Consulting, Charlotte, NC

June-August 2010

• Filed Time Reports, Expense Reports, and assisted in project management

Andrew E. Mlynarczyk

Clemson, SC 29631 • amlynar@clemson.edu • (301) 706-1143 • Linkedin.com/amczyk

Education:

Clemson University

• Master of Engineering, Biomedical Engineering

May 2016

• Bachelor of Science, Bioengineering

May 2015

■ Biomaterials Concentration, 3.84 GPA

Experience:

Product Development Student

Aug 2014-Present

Clemson University, Master of Engineering Program

- Meet with top key opinion leaders to perform needs validation of a medical device
- Define regulatory standards and initiate plan to follow regulations
- Implement design changes to a medical device based on risk analysis and user inputs
- Develop verification and validation tests to ensure requirements and user needs are met

Medical Device Design

Aug 2014-May 2015

Clemson University

- Created and modified 3D models of a medical device using Solidworks
- Met with manufacturer and delivered design documents for producing device components
- Determined design requirements for device by obtaining user input from surveys and interviews with clinicians
- Obtained provisional patent for technology created
- Technology was awarded the audience's choice award at the Clemson Design Symposium

Research Assistant Aug 2014-July 2015

Clemson University, Institute for Biological Interfaces of Engineering

- Provided cell culturing of bone grafts during differentiation studies
- Sectioned bone graft samples and analyzed properties of samples using biochemical assays and histological staining
- Credited as a second author for a journal article

Clinical Intern Jun 2014-Aug 2014

Clemson University, Greenville Health System (GHS)

- Collaborated with students and clinicians to document, assess, and disseminate clinical needs
- Shadowed and interviewed clinicians in diverse areas to determine most prominent clinical needs
- Logged over 100 hours of shadowing in the operating room and the clinical setting
- Constructed a database of clinical needs composed of over 150 needs
- One of two groups selected to present needs database to executive members of GHS

Undergraduate Researcher

Jan 2014- Dec 2014

Clemson University, Creative Inquiry

- Reviewed literature to determine most effective method for decellularizing intervertebral discs
- Constructed and improved protocols for removing cells from intervertebral discs
- Analyzed biochemical structure of scaffold through biochemical analysis and histological staining
- Managed and led a group of six bioengineering undergraduates throughout the project

Leadership and Mentorship:

President, Alpha Eta Mu Beta

Aug 2014-Jun 2015

- Led an organization of over 25 students providing professional development to each member
- Coordinated and created organization timeline with chapter advisor and chapter officers
- Coordinated with other biomedical organizations to provide professional development events
- Represented the Clemson University chapter at the Society's National Convention

Design Team Mentor, Clemson University

Aug 2015-Present

- Mentor a group of four senior bioengineering students on their capstone project
- Provide feedback on gate presentations and give suggestions for improvement on their project
- Provide professional development for students

Organizations:

- Alpha Eta Mu Beta National Biomedical Engineering Honor Society
- Tau Beta Pi Honors Engineering Society (Top 1/8th of juniors & 1/5th of seniors)
- Calhoun Honors College
- Young Americans for Freedom Political activism organization
- Silver Wings Professional development and service organization
- Biomedical Engineering Society
- Clemson Bioengineering Society

Skills:

Solidworks	Cryosectioning	Microsoft Excel
Matlab	Cell Culture	Microsoft
IMovie	PicoGreen	PowerPoint
H&E Staining	ALP Phosphatase Activity	Microsoft Excel
Masson's	Assay	
Trichrome	DMMB Assay	

EVAN ROBINSONN

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EDUCATION

Master of Engineering in Biomedical Engineering, Clemson University

Clemson, SC

August 2015-Present Clemson, SC

Bachelors of Science in Bioengineering, Clemson University

Concentration: Biomaterials Concentration

May 2015 GPA: 3.38

BIOENGINEERING EXPERIENCE

CLEMSON UNIVERISTY

Clemson, SC

Master of Engineering Design

August 2015-Present

- Conducting key opinion Leader meetings to receive design inputs and improvement suggestions on an existing prototype design
- Investigating current regulatory pathways in the US and OUS for an intended Class II medical device prototype

CLEMSON UNIVERISTY

Clemson, SC

Senior Design Theory and Application

August 2014-May 2015

- Engaged with clinicians at Greenville Health System in order to focus in on a clinical need within Vascular Medical Field
- Designed and developed a prototype for a tunneled catheter discharging device
- Conducted verification and validation testing for the TC Discharger
- Pursuing patent protection for the TC Discharger currently with the Clemson University Research Foundation

CLEMSON UNIVERSITY

Clemson, SC

Undergraduate Research Assistant

May 2013 - August 2014

- Conducted Research in the Cellular and Nanomechanics Lab
- Investigated diverse forms of cell culture, histology, aseptic techniques, and cellular assays
- Poster: Desai, Aesha; Robinson, Evan; Deitch Sandra; Dean, Delphine; "Effects of Blocking Cell-Cell and Cell-Matrix Interactions on Mechanical Properties of Cardiomyocytes" Arkansas INBRE Research Conference 2013
- Poster: Robinson, Evan; Desai, Aesha; Rodriguez-Devora, Jorge; Dean, Delphine; "Characterizing Mechanical Properties of Cardiac Microtissues" *BMES* 2014

LEADERSHIP EXPERIENCE

CLEMSON UNIVERSITY

Clemson, SC

Subgroup Research Leader

August 2014 – December 2014

- Organized small subgroup within lab to accomplish weekly goals in research project
- Conducted research in the Cellular and Nanomechanics Lab
- Reported research findings to main group and delegated what needed to be done for upcoming weeks

SKILLS/RELEVANT COURSES	Matlab Cell Culture Presentation Skills	Solidworks Design Theory/Application Biomaterials	Drug Delivery Aseptic Techniques Biomechanics
AWARDS	Taylor Michaels Scholarship Recipient Dean's List Palmetto Fellows Scholarship Recipient		August 2011 – May 2015 August 2013 – Present August 2011 – May 2015
ACTIVITIES/ INTERESTS	Member, National Society of Leadership and Success Member, IPTAY Collegiate Club Member, Clemson Bioengineering Society		August 2011-Present August 2011-August 2013 October 2015-Present