# Brett Burton | Curriculum Vitae

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## Education

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|---|---|
| **Ph.D in Bioengineering – In progress** | **Salt Lake City, UT** |
| *University of Utah* | *2008–Present* |
| Computational modeling of cardiac electrophysiology during ischemia | |
| **H.B.S. in Bioengineering** | **Salt Lake City, UT** |
| *University of Utah* | *2005–2008* |
| Graduated with honors | |
| Emphasis on cardiac electrophysiology | |
| **A.E. in Electrical, Mechanical, & Computer Engineering** | **Twin Falls, ID** |
| *College of Southern Idaho* | *2000–2001,2004–2005* |

## Ph.D Research

**Title**: *Parameterization of Image-Based Modeling in Partial Thickness Myocardial Ischemia*

**Advisor**: Rob S. MacLeod

**Description**: This work is a three part exploration of image-based cardiac models of partial thickness ischemia and the errors associated with model parameterization.

○ Part I: Model generation
  - validation of computer simulations of ischemia derived from large animal experimental models
  - comparison of derived epicardial potentials with those of traditional modeling approaches
○ Part II: Parameterization of ischemic source geometries
○ Part III: Assessment of variability in surface potentials due to cardiac fiber orientation

## Experience

Research & Clinical Experience

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| **Graduate Research Assistant** | **Salt Lake City, UT** |
| *University of Utah - Scientific Computing and Imaging Institute* | *2008–Present* |

○ Generated computational models of partial thickness ischemia
○ Assisted in wet lab experiments using large animal models with induced, acute, myocardial ischemia
○ Collaborated within multiple working groups
  - Simulation & Estimation
  - Experimental Data and Geometric Analysis Repository (EDGAR)
  - Consortium for ECG Imaging (CEI)
○ Contributed to production of open source modeling software
  - Documentation
  - Testing & troubleshooting
  - Quality control
  - Code porting (C++ and Matlab)

**Clinical Study Supervisor**                                  **Salt Lake City, UT**
*Atrispec Study - University of Utah Hospital*                          *2015–2016*

○ Organized pre-operative, atrial fibrillation, risk assessment study
○ Interfaced with IRB
○ Coordinated contributing physicians
○ Obtained patient consent
○ Administered high resolution, signal averaged ECGs in clinic
○ Processed scan data
○ Hospital interactions
   – Billing                              – Insurance
   – Technology Assessment Committee      – Pre-op & Post-op Clinics
○ ...see also Business Development Experience

**Undergraduate Research Assistant**                           **Salt Lake City, UT**
*Undergraduate Research Opportunity Program (UROP) - University of Utah*      *2006–2008*

○ Constructed initial cardiac forward model of ischemia used throughout my graduate research

**Intern**                                                     **Salt Lake City, UT**
*Utah Artificial Heart Program - LDS Hospital*                         *2005–2006*

○ Analyzed patient databases for coagulation criteria of LVAD recipients

## Teaching Experience

**Teaching Assistant**                                         **Salt Lake City, UT**
*Physiology 6000 - Department of Bioengineering - University of Utah*         *2010*

○ Setup, administered, and graded labs      ○ Delivered select lectures
○ Proctored tests

**Teaching Assistant**                                         **Park City, UT**
*IBBM Workshop - Center For Integrative Biomedical Computing (CIBC)*       *2014–2016*

   The IBBM Workshop is a two week program offered annually to graduate students, faculty members, and
   industry researchers to teach and demonstrate <u>I</u>mage-<u>B</u>ased, <u>B</u>iomedical <u>M</u>odeling techniques.
○ Delivered labs, lectures, and assistance in:
   – Segmentation           – Meshing              – Inverse Modeling
   – Source Modeling        – Forward Simulation
○ Software Packages
   – SCIRun                 – BioMesh3D            – Gmesh
   – Seg3D                  – Cleaver Meshing Package – ImageVis3D

**Teaching Assistant**                                         **Salt Lake City, UT**
*IIBM Course - Center For Integrative Biomedical Computing (CIBC)*         *2015*

   The Introduction to Image-Based Modeling (IIBM) Course is similar to its parent class (the above IBBM
   Workshop), but it is geared to, and suited for, undergraduate researchers over the course of a semester.
○ Developed and delivered lectures on the above-mentioned topics (see IBBM Workshop sub-categories) to
   undergraduate researchers

**Presenter**                                                  **Brooklyn, NY**
*ISBI Lunch Lecture Series*                                            *2015*

○ Offered a lunchtime demo on CIBC software packages used for image-based modeling

## Business Development Experience

**Entrepreneurial Lead** **Salt Lake City, UT**

*Atrispec - Atrial Fibrillation Risk Assessment Software* *2011–2016*

- Commercialization of University of Utah owned technology
- Lead small entrepreneurial team from business development to clinical study to eventual project suspension
- Business Plan Competitions
  - University of Utah Opportunity Quest finalist (2012)
  - University of Oregon New Venture Championship finalist (2012)
- Investor Presentations & Funding
  - University of Utah TVC Engine Fund - $2,000 non-dilutive award
  - University of Utah TVC Engine Fund 2-stroke - $25,000 non-dilutive award
  - University of Utah Center For Medical Innovation I-Corps - $3,000 non-dilutive award
- Business Development Training
  - University of Utah Lassonde Technology (2011–2012)
  - University of Utah Center For Medical Innovation I-Corps - mini training program
  - University of Utah USTAR I-Corps - full training and development program

**Senior Associate** **Salt Lake City, UT**

*University Venture Fund* *2013–2015*

- Lead student teams in potential and current portfolio investments
- Analyzed company histories, revenue models, markets, competition, valuation, and financials
- Investments & Value Add Projects
  - Lyft
  - Lineagen
  - Instructure
  - Tute Genomics
  - Veritract
  - etc...

**Student Associate/Assistant Student Associate Director** **Salt Lake City, UT**

*Lassonde Entrepreneur Institute - University of Utah* *2011–2013*

- 2011–2012: Developed initial business plan for Atrispec (atrial fibrillation risk assessment) technology
- 2012–2013: Coordinated 3 teams of graduate students on technology commercialization projects

## Miscellaneous

**Police Dispatcher** **Salt Lake City, UT**

*University of Utah Public Safety* *2005–2008*

# Publications

### Book Chapters

1. P Rosen, BM Burton, K Potter, CR Johnson. "$\mu$View: A Visual Analysis System for Exploring Uncertainty in Myocardial Ischemia Simulations" Visualization in Medicine and Life Sciences III, Chapter 3, 49-69, 2016

### Journals

1. KK Aras, DJ Swenson, BM Burton and RS MacLeod. Spatio-Temporal Progression of Acute Myocardial Ischemia, American Journal of Physiology 2016, in submission
2. KK Aras, BM Burton, DJ Swenson, and RS MacLeod. Spatial organization of acute myocardial ischemia. Journal of Electrocardiology 49 (3): 323-36, 2016
3. KK Aras, W Good, JD Tate, BM Burton DH Brooks, J Coll-Font, O Doessel, W Schulze, D Potyagaylo, LW Wang, P van Dam, and RS MacLeod. Experimental Data and Geometric Analysis Repository-EDGAR, J Electrocardiology 2015, 48 (6): 975-81, 2015

4. K Aras, BM Burton, DJ Swenson, RS MacLeod. "Sensitivity of epicardial electrical markers to ischemia detection" Journal of Electrocardiology 47 (6): 836-41, 2014.

Conference Proceedings

1. BM Burton, KK Aras, JD Tate, W Good, RS Macleod. "The Role of Reduced Left Ventricular, Systolic Blood Volumes in ST Segment Potentials Overlying Diseased Tissue of the Ischemic Heart" Computers in Cardiology 2016 *accepted*.
2. J Coll-Font, BM Burton, JD Tate, B Erem, DJ Swenson, D Wang, DH Brooks, P vanDam, RS Macleod. "New Additions to the Toolkit for Forward/Inverse Problems in Electrocardiography within the SCIRun Problem Solving Environment" Computers in Cardiology 2014.
3. JD Tate, T Pilcher, K Aras, BM Burton, RS Macleod. "Verification of a Defibrillation Simulation Using Internal Electric Fields in a Human Shaped Phantom" Computers in Cardiology 2014.
4. P Rosen, BM Burton, K Potter, CR Johnson. "Visualization for understanding uncertainty in the simulation of myocardial ischemia" The 3rd International Workshop on Visualization in Medicine and Life Sciences.
5. BM Burton, B Erem, K Potter, P Rosen, CR Johnson, DH Brooks, RS MacLeod. "Uncertainty visualization in forward and inverse cardiac models" Computers in Cardiology 2013.
6. S Meng, J Zhao, BM Burton, NA Lever, IJ LeGrice, BH Smaill. "Accurate endocardial activation representation of atria by non-contact mapping" Computers in Cardiology 2012.
7. BM Burton, JD Tate, B Erem, DJ Swenson, DF Wang, DH Brooks, PM van Dam, RS MacLeod. "Forward/Inverse toolkit in the SCIRun problem solving environment" EMBC: IEEE Engineering in Medicine and Biology, 2011.
8. DJ Swenson, JG Stinstra, BM Burton, KK Aras, L Healy, RS MacLeod. "Evaluating the Effects of Border Zone Approximations with Subject Specific Ischemia Models" Proceedings of the 11th International Congress of the IUPESM 2009.
9. DJ Swenson, JG Stinstra, BM Burton, KK Aras, RS MacLeod. "Wave Equation Based Interpolation on Volumetric Cardiac Electrical Potentials" Computers in Cardiology 2009.

## Invited Presentations

Oral Presentations

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|---|---|
| **Contribution of Ventricular Blood Volume in Subendocardial Ischemia** | **Vancouver, CA** |
| *Computing In Cardiology* | *2016* |
| **Uncertainty Visualization of Forward and Inverse Cardiac Models** | **Zaragoza, ES** |
| *Computing In Cardiology* | *2013* |
| **Atrispec - An atrial fibrillation risk assessment software** | **Portland, OR, USA** |
| *New Venture Championship* | *2012* |
| **Atrispec - An atrial fibrillation risk assessment software** | **Park City, UT, USA** |
| *Park City Angels* | *2012* |

Poster Presentations

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|---|---|
| **The Forward Inverse Toolkit in SCIRun** | **Boston, MA, USA** |
| *IEEE: EMBC* | *2011* |
| **The Forward Problem of Electrocardiology** | **Salt Lake City, UT, USA** |
| *SCIx* | *2011/2012* |

## Software Packages

**Basic**: PYTHON, Adobe Photoshop/Premier, MySQL, C/C++

**Intermediate**: Matlab, HTML, LaTeX, Microsoft Office, OSX, iWorks, Adobe Illustrator/Dreamweaver

**Advanced**: SCIRun, Seg3D, Cleaver, BioMesh3D

## Awards, Honors, and Service

**2014–Present**: Scientific Computing & Imaging Institute Social Activities Committee Member

**2012–Present**: Children's Choir Chorister

**2010–Present**: Science Fair Judge (9 - 12 year old)

**2011/2013**: First Lego League Judge

**2008–2010**: Secretary and Webmaster of Bioengineering GSAC, University of Utah

**2007–2008**: Vice President of Biomedical Engineering Society, Utah Chapter

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**2008**: Honors B.S. & Undergraduate Research Scholar Designation, University of Utah

**2006–2007**: Josephine Beam Scholarship, University of Utah

**2005–2006**: Freebody Transfer Scholarship, University of Utah

**2005–2006**: Bioengineering Faculty Scholarship, University of Utah

**2004**: Phi Theta Kappa and Golden Key member, College of Southern Idaho

## Languages

- English (native)
- Spanish

## Interests

- Triathloning
- Books
- Disc Golf
- Kayaking
- SCUBA
- Singing and Conducting
- Cartoons
- Camping
- Tech
- Board Games
- Family
- American Football