

Reed B. Jacob

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Education: Boise State University

2004 B.A. Music Composition, Boise State University, Boise, ID.
GPA: 3.54/4.0

2012 MS Interdisciplinary Studies: Computational Biochemistry, Boise State University, Boise, ID.
GPA: 3.7/4.0

Professional Positions:

Feb 2009 – Present **Graduate Research Assistant, Interdisciplinary Science Masters Program**
Duties: RA for Dr. Owen McDougal, assisting in research and lab management.

August – Dec 2008 **Stock Room Assistant for Boise State Department of Chemistry**
Duties: setup up undergraduate labs, including equipment, chemical solutions. Required training for hazardous material cleanup and handling.

March – Dec 2008 **Lab Tech for Boise State Department of Chemistry**
Duties: Worked as a data recorder and analyst. Performed Biological assays and assisted in data interpretation.

Dec 2007 – Present **Private Music Instructor, Composition and Piano**
Duties: Instructed students of ages ranging from five yrs to adults in music theory, composition, pedagogy, and performance techniques, using methods such as Suzuki, Faber, and Hal Leonard, requiring bi-annual student performances.

Research Experience:

Department of Chemistry and Biochemistry – McDougal Lab

Feb 2009 – Present

Boise State University, Boise, ID

Current projects: 1) DockoMatic – development of a software suite to assist with molecular docking simulations, high throughput virtual screening (HTVS), linear peptide ligand creation, and peptide analog creation. 2) Conotoxins – Simulation of chemical interactions between nicotinic acetylcholine receptors and conotoxins using DockoMatic. 3) Ospecweb – design and maintenance of a web resource, with associated servers, dedicated to organic chemistry learning through analytical instruments.

Past projects: 1) DNA Safeguard – synthesized short amino acid sequences of length five, pentapeptides, not reported in any species' genome, to investigate for bioactivity in conjunction with a bioinformatic approach. 2) MRSA – Molecular docking of nullomer pentapeptides in tandem with oxacillin, targeting Penicillin Binding Protein 2a (*Sa*-PBP2a) isolated from the methacillin resistant strain of *Staphylococcus aureus* (MRSA).

Department of Chemistry and Biochemistry – Charlier Lab

March 2008 – Feb 2009

Boise State University, Boise, ID

Past project: Human Carboxyl Reductase (HCBR) – anthracyclines have a great propensity for cytotoxicity, cancer cell irradiation, but appeared to become reduced and aggregating toward the heart leading to cardiotoxicity. Upon investigation, HCBR is the reducing agent, specifically targeting key carbonyls. I performed biological assays to test HCBR kinetic activity in the reduction of NADPH, collating and analyzing the data computationally.

Publications:

Ming Fang, **Reed Jacob**, Owen McDougal, Julia Thom Oxford. "Minor fibrillar collagens; variable regions alternative splicing, intrinsic disorder, and tyrosine sulfation" *Protein & Cell*, (in press).

Reed B. Jacob, Tim Andersen, and Owen M. McDougal. "Molecular Docking Software for High Throughput Virtual Screening," *PloS*, (submitted December 2011).

Reed B. Jacob, Casey W. Bullock, Tim Andersen, and Owen M. McDougal. "DockoMatic – Automated Peptide Analog Creation for High Throughput Virtual Screening" *J. Comp. Chem.* 32.13 (2011): 2936-2941

Casey W. Bullock, **Reed B. Jacob**, Owen M. McDougal, Greg Hampikian, and Tim Andersen. "DockoMatic - Automated Ligand Creation and Docking" *BMC Research Notes* 3.289 (2010).

Reed B. Jacob and Owen M. McDougal. "The M-Superfamily of Conotoxins: A Review" *Cellular and Molecular Life Sciences* 67.1 (2010): 17-27.

Published Posters and Presentations:

- 9/11 **Reed B. Jacob** and Owen M. McDougal, poster presentation, "DockoMatic with Relaxator: Receptor Side-Chain Flexibility" The second annual CAES Workshop on Modeling, Simulation, and Visualization, Boise ID.
- 6/11 **Reed B. Jacob** and Owen M. McDougal, presentation, "Predictive Potential Unraveled with DockoMatic" AAAS Pacific Division, San Diego CA.
- 9/10 Owen M. McDougal and **Reed B. Jacob**, poster presentation, "The Automatic DockoMatic: Ligand and Receptor Screening made easy" ACS national conference, Boston MA.
- 3/10 **Reed B. Jacob**, Casey Bullock, Owen M McDougal and Tim Anderson, poster presentation, "Introducing DockoMatic: Automated Ligand and Receptor Screening" ACS national conference, San Francisco CA.
- 6/09 **Reed B. Jacob**, Owen McDougal, and Ken Cornell, presentation, "Finding MRSA's Kryptonite: Computational Directed Combatant Pentapeptides" AAAS Pacific Division San Francisco CA.
- 4/09 **Reed B. Jacob**, Matt Walters, Ken Cornell, and Owen McDougal, poster presentation, "Resistance is Not Futile: Computational Directed Design of Combatant Pentapeptides" Undergraduate Research Conference, Boise State University, Boise, ID.

Workshops and Conferences Attended:

- 9/11 The second annual Center for Advanced Energy Studies Workshop on Modeling, Simulation, and Visualization, Boise ID.
- 8/11 The first annual Computational Chemistry Workshop, Boise State University, Boise, ID.
- 6/11 The 93rd annual American Association for the Advancement of Science Pacific Division, San Diego CA
- 3/10 The 239th annual American Chemical Society national conference, San Francisco CA.
- 6/09 The 91st annual American Association for the Advancement of Science Pacific Division San Francisco CA.
- 4/09 Undergraduate Research Conference, Boise State University, Boise, ID.

Awards and Honors:

- First place, 93rd annual AAAS Pacific Division conference, combining sections: Agriculture and Horticultural Sciences, Chemistry and Biochemistry, Computer and Information Sciences, Physics and Materials Science, Cell and Molecular Biology Sections.

- Deans list multiple semesters both as an undergraduate and graduate student
- Eagle Scout, Boy Scouts of America
- Director's choice by Paramount Group for a Musical Composition
- First place, Idaho Music Teachers Association "Composer of the Year" (Chopin) festival
- Music scholarships in Piano Performance, Boise State University (multiple years)
- Accompaniment Scholarships for summer education programs, Boise Tuesday Musicale (multiple years)

Relevant Coursework:

Advanced Biochemistry I	A-
Intermediary Metabolism	A-
Molecular Neurobiology	B
Writing in Biomedical Sciences	A
Data Structures and Algorithms	A+
Multivariable and Vector Calculus	A
Discrete Math and Analysis	B
Bioinformatics	A
Intro to Molecular Modeling	A
Artificial Intelligence	A
Applied Stats with Computers	A
General Chemistry I and Lab	A
General Chemistry II and Lab	A
Organic Chemistry I and Lab	A
Organic Chemistry II and Lab	A-
Physics I for scientists and Lab	A
Physics II for scientists and Lab	A-
Genetics	B
Cell Biology	A

Skills:

- Experience with C, C++, C#, Java, Python, Perl, Ruby, HTML and PHP programming languages
- Proficient with Microsoft Office, Adobe Design Suite, Symyx draw, Chemdraw, Spartan, Amber, Gaussian, VMD, Pymol, Wincoot, AutoDock, Modeller, Open Babel, Finale (Music composition software), Vegas (video editing), Soundforge (sound editing), Chimera, Blast, and bioinformatic searches using NCBI web resources such as, PubMed, Gene, Protein, Blast, Epigenomics, and Structure.
- Molecular Docking studies using AutoDock and DockoMatic
- Proficient Pianist (Over 20 yrs experience)
- Piano Teacher for over 15 years with 100+ total students.
- Music composition, currently have over 30+ compositions and arrangements.
- Personal Assistant for Jacob Music Studio
- Music Director for Music Theatre of Idaho (MTI) and Boise Actors Guild (BAG)

Service:

- Youth Sunday school instructor ages 16-17.
- Assistant Scout Master
- Regular blood donor
- Music Devotional leader, charged with organizing musical firesides, and composing or arranging music for various instrumental and vocal combinations.
- Volunteer for Boise Tuesday Musicale and Enhancing Music Education in Idaho.
- Accompanist for community and private events
- Tutor for students in general, organic, and biochemistry, calculus, discrete mathematics, computer

programming, data structures and algorithms, computer science, music theory, music history, music analysis,
and piano performance