Rebecca B. Smith

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EDUCATION:

Postdoctoral Fellow
St. Jude Children's Research Hospital **Memphis, TN** **2009- 2013**
Developmental Neurobiology
Advisor: J. Paul Taylor, MD, PhD
Project Title: Investigating TDP-43 Function in *Drosophila* ALS Disease Model

PhD Genetics
University of Alabama at Birmingham **Birmingham, AL** **2003-2009**
Genetics Department
Advisor: Guillermo Marqués, PhD
PhD thesis title: Axonal trafficking of BMP signals in *Drosophila* motor neurons

BS Biology. Minors: Chemistry, Psychology
University of Tennessee at Chattanooga **Chattanooga, TN** **1997-2001**
Departmental Honors Project: The Role of Photosynthesis in Ultraviolet Responses: Are UV Responses Different in Maize *Albino*Mutants That Have No Chloroplasts?

ADDITIONAL APPLICABLE TRAINING/ CERTIFICATIONS:

ASCP Technologist in Molecular Biology Certification **Feb, 2015**

4th Annual Short Course on Next-Generation Sequencing: Technology & Statistical Methods
University of Alabama at Birmingham **Birmingham, AL** **Dec, 2014**

PUBLICATIONS:

1. **Rebecca B. Smith**‡, Nael H. Alami‡, Monica A. Carrasco, Luis A. Williams, Christina Winborn, Steve S. W. Han, Brett Winborn, Evangelos Kiskinis, Peter Vogel, Brian D. Freibaum, Anderson Kanagaraj, Alison J. Clare, Bilada Bilican, Edward Chaum, Siddharthan Chandran, Christopher E. Shaw, Kevin C. Eggan, Tom Maniatis, and J. Paul Taylor. "Microtubule-dependent transport of TDP-43 mRNA granules in neurons is impaired by ALS-causing mutations." *Neuron,* 5 February 2014, 81(3); 536-543

2. Nam Chul Kim, Emilie Tresse, Regina-Maria Kolaitis, Amandine Molliex, Ruth E. Thomas, Nael H. Alami, Bo Wang, Aashish Joshi, **Rebecca B. Smith**, Gillian P. Ritson, Brett J. Winborn, Jennifer Moore, Joo-Yong Lee, Tso-Pang Yao, Leo Pallanck, Mondira Kundu, J. Paul Taylor. "VCP Is Essential for Mitochondrial Quality Control by PINK1/Parkin and this Function Is Impaired by VCP Mutations." *Neuron*, 10 April 2013, 78(1); 65-80, ISSN 0896-6273.

PUBLICATIONS (continued):

3. J Gavin Daigle, Nicholas A Lanson Jr, **Rebecca B. Smith**, Ian Casci, Astha Maltare, John Monaghan, Charles D Nichols, Dimitri Kryndushkin, Frank Shewmaker, Udai Bhan Pandey. "RNA binding ability of FUS regulates neurodegeneration, cytoplasmic mislocalization and incorporation into stress granules associated with FUS carrying ALS-linked mutations." *Hum Mol Genet*, 2013 Mar 15;22(6):1193-205. doi: 10.1093/hmg/dds526

4. **Rebecca B. Smith**, Jim Machamer, Nam Chul Kim, Thomas Hays, Guillermo Marqués. "Relay of retrograde synaptogenic signals through axonal transport of BMP receptors." *Journal of Cell Science*. 2012, Aug 15th. doi: 10.1242/jcs.094292.

5. Nicholas A. Lanson Jr., Astha Maltare, Hanna King, **Rebecca Smith**, Ji Han Kim, J. Paul Taylor, Thomas E. Lloyd and Udai Bhan Pandey. "A Drosophila model of FUS-related neurodegeneration reveals genetic interaction between FUS and TDP-43." *Human Molecular Genetics*, 2011 May 11. doi:10.1093/hmg/ddr150.

6. **Rebecca B. Smith**, J. Paul Taylor. "Dissection and Imaging of Active Zones in the Drosophila Neuromuscular Junction." *J Vis Exp,* 2011 Apr 27;(50). doi: 10.3791/2676 http://www.jove.com/details.stp?id=2676

7. **Rebecca Smith**, Samuel Connell, Jennifer Peters, and J. Paul Taylor. **Cover Art.** *Neuron*, 2010 Sep 23; 67(6).

8. Natalia B. Nedelsky, Maria Pennuto, **Rebecca B. Smith**, Isabella Palazzolo, Jennifer Moore, Zhiping Nie, Geoffrey Neale, J. Paul Taylor. "Native functions of the androgen receptor are essential to pathogenesis in a *Drosophila* model of spinobulbar muscular atrophy." *Neuron*, 2010 Sep 23; 67(6):936-52.

9. **Rebecca B. Smith.** "Axonal Transport of BMP signals in *Drosophila* motoneurons." Ph.D. Dissertation. The University of Alabama at Birmingham. 2009.

EXPERIENCE

Associate Scientist **July 2015-present**

Molecular Diagnostics Division
Aegis Life Sciences Corporation, Nashville , TN

- **Projects:**
  - Conducting sequencing assay for mutations in a common cancer susceptibility gene in order to determine patient's eligibility to participate in clinical trails.
    - Conducting DNA extraction from patient blood

- Following work-flow protocols and filling out regulatory forms associated with protocols
- Working within chain of custody and LIMS system.
- Meeting turn around time estimates
- Filling out reports and classifying variants within ACMG guidelines

- Reviewing pharmacogenetic assay data analysis, reporting the results, and developing additional assays for more complete coverage of critical drug response alleles

Scientist II **Jan 2014-July 2015**

Insight Genetics, Nashville, TN

Insight Genetics is a molecular diagnostic company that focuses on developing diagnostic assays for detecting biomarkers in tumors for the goal of administering precision medicine for the patient

- **Responsibilities:**
  - Running and troubleshooting assays, managing multiple projects and personnel, writing grants, and optimizing lab-derived tests along-side research associates.
  - Creating protocols, managing CLIA validation of assays, CLIA reports, and coordinating proficiency tests for CAP certification,
  - Writing scientific blog posts for the company
  - Working within ISO certification standards to prepare for future audits
- **Projects:**
  - Optimizing and CLIA validation of a DNA genotyping assay to identify KIR profiles for donor/patient matching for Hematological Stem Cell Transplants
  - Managing RNA-Sequencing project of Triple negative breast cancer (TNBC) patient samples to optimize patient genetic profile categories for drug response.
  - Developing lab derived qPCR assays and completing CLIA validation for these tests to detect oncogenic overexpression and fusion genes driving tumor growth.
  - Collaborating with QIAGEN on the design control process of a qPCR ALK-fusion qPCR kit.
  - Managing development of a ROS-fusion break-apart FISH assay.
- **Skills, Techniques and Tools**:
  - Utilizing qPCR multiplex assays, genotyping assays, extractions of cells and FFPE blocks while working with automated machines such as the Qiagen Rotor Gene-Q, Qiagen QiaCube, Life Technologies Quantstudio.

Rebecca B. Smith

Post Doctoral Research Fellow **2009 –2013**

Developmental Neurobiology, J. Paul Taylor Laboratory
St Jude Children's Research Hospital, Memphis, TN

- **Responsibilities**:
  - Studying RNA binding proteins and their role in neurodegenerative diseases such as SBMA, ALS, FTLD.
  - Characterizing the normal function of the RNA binding protein, TDP-43 in neurons and muscle.
- **Project**s:
  - Studying axonal transport of TDP-43 in live *Drosophila* motor neurons
  - Identifying mRNA targets by microarray, RNA-sequencing, and CLIP-sequencing.
- **Results:**
  - Discovered that TDP-43 carrying ALS mutations display a defect in axonal trafficking of mRNA, suggesting a possible mechanism for this disease, publishing the findings in *Neuron.*
  - Published a number of additional studies in leading scientific journals including *Neuron* and *Human Molecular Genetics,* and developed a novel protocol for motor neuron imaging that was featured by the *Journal of Visualized Experiments (JoVE)*.
- **Skills, Techniques, Tools**:
  - Regular use of live cell imaging, confocal microscopy, *Drosophila* genetics, as well as biochemical and molecular genetic approaches to identify the role of TDP-43 in cellular processes.

Visiting Researcher **December 2011**

Institute for Translational Medicine and Therapeutics, Zissimos Mourelatos Laboratory
The University of Pennsylvania

Visited the lab of Dr. Zissimos Mourelatos to identify direct targets of RNA-binding proteins by CLIP-sequencing technique. Utilized radioactive labeled primers, PCR, RT-PCR, biochemical approaches to identify these targets.

Graduate Research Associate **2003 – 2009**

Genetics Department, Guillermo Marqués laboratory
The University of Alabama at Birmingham

- Studied the mechanism by which a Bone Morphogenic Protein retrograde pathway signals in *Drosophila* motor neurons, thereby establishing proper communication between the developing muscle and innervating neuron.
- Discovered a signaling endosome mechanism to establish long-range receptor phosphorylation and down stream transcription factor activation.

- Regularly used skills were imaging, confocal microscopy, *Drosophila* genetics, cell culture, as well as biochemical and molecular genetic techniques to study this pathway mechanism.

Cold Spring Harbor Course Participant **July 2006**

Drosophila Neurobiology: Genes, Circuits and Behavior
Instructors: Scott Waddell, Greg Bashaw and Bing Zhang

Intensive three-week course with daily lectures and laboratory sessions. Studied a variety of techniques including electrophysiology, imaging, anatomical examinations and circuit mapping as well as quantitative behavioral measures. Competitive admission.

Lab Technician II **2002 –2003**

Plant Sciences Department, Lee Pratt Laboratory
The University of Georgia

Studied Expressed Sequence Tags and conducted high-throughput mini-prepping, sequencing, PCR, and storage of unique gene set from multiple organisms.

- Responsible for running machines such a Hydra, Omni-grid microarray spotter, 3700 ABI sequencer, and Biorad Biomek.
- Chosen to lead a project organizing identified genes of interest with Biorad hit picker and ultimately spotting these unique genes on custom microarray slides with OmniGrid spotter.
- Responsible for quality control of sequences and ABI 3700 Sequencer general maintenance.

Research Assistant **2000–2001**

Department of Biology, Ann Stapleton Laboratory
The University of Tennessee at Chattanooga

Studied the effect of UV on *Maize* Albinomutants that lack chloroplasts. Discovered that UV damage to chloroplast is not the primary mechanism by which high doses of UV causes damage to *Maize*.

ADDITIONAL PROFESSIONAL/ TEACHING EXPERIENCE:

Microsoft Project Software Training Courses I & II **2014**

Reviewer for PLoS One Journal **2012**

Student Mentor **2010-2011**

Partnership between St. Jude Children's Research Hospital and the University of Bath, England. Year Abroad Program.

Mentored undergraduate student in all aspects of her project including project development, learning experimental techniques to complete experiments, analysis of data and results, presenting her results in a manuscript, poster, and PowerPoint presentations.

Lecturer **2008**

Basic Human Genetics

"Drosophila Model System" Lecture and Lab exercise. 1st year curriculum for UAB Genetic Graduate Students. Model Organism Block. Supervising head- Dr. Robert Kesterson.

AWARDS/ HONORS:

Presentation Awards

UAB Graduate Student Research Day 2008: 2nd place presentation in life sciences
UAB Graduate Student Research Day 2006: 1st place presentation in life sciences
UAB Cell Biology Retreat 2006: 2nd place presentation.

Travel Award (2006)

UAB Genetics Department student travel award

Carmichael Scholarship (2003-2007)

Competitive award by UAB Medical Alumni for payment of tuition, fees, and partial stipend support

Brock Scholar (1997-2001)

UTC scholarship award of full tuition and housing stipend.

LEADERSHIP/ INSTITUTIONAL SERVICE:

Volunteering with cancer patients of St. Jude Children's Research Hospital- (2012- 2013)
St. Jude Postdoctoral Council (2012-2013)- Chair for Local Outreach
Green Initiative at UAB (2007-2009)- President and founder-2007-2008, Vice-President-2008-2009. Founded an environmental group that worked with UAB administration to establish a campus wide recycling program and increase energy conservation.
UAB Graduate Student Association (2004-2005)

Genetics Department Representative, Activities Chairman

UTC Honor's Program Recruitment Alumni Interviewer (2003-2007)
UTC Motor Board Senior Honor Society (2000-2001)- President
UTC Honor's Program (1997-2001)- Class representative (1997-1999)

PROFESSIONAL SOCIETIES:

American College of Medical Genetics- Affiliate Scientist Member (2015-present)
American Society of Human Genetics (2012-present)
Genetics Society of America (2012-2014)
Society for Neuroscience (2012-2013)
National Postdoctoral Association (2009-2013)
AAAS Member (2005-2014)

PLATFORM PRESENTATIONS:

Rebecca Smith, Sarah Mische, Thomas Hays, Guillermo Marqués."BMP Signaling in Drosophila Motoneurons is Regulated by Endocytic Trafficking." UAB Graduate Student Research Days 2008- February 28th-29th, 2008

Rebecca Smith, Guillermo Marqués. "Rab5 Regulates BMP Signaling in *Drosophila* Motoneurons." Genetics Departmental Retreat. September 6th,2007.

Rebecca Smith, Sarah Mische, Thomas Hays, Guillermo Marqués. "Axonal Transport of BMP signals in Motoneurons." UAB Cell Biology Retreat. September 9th-10th, 2006.

Rebecca Smith, Sarah Mische, Thomas Hays, Guillermo Marqués. "Axonal Transport of BMP signals in Motoneurons." UAB Graduate Student Research Days 2006- March 2nd, 2006

POSTER PRESENTATIONS:

Rob Seitz, David Hout, Stephan Morris, **Rebecca Smith,** Brian Lehman, Xou Chen, Jennifer Pietenpol, Brian Ring. Creation of a robust algorithm utilizing minimal gene sets normalized against a reference gene set to identify triple-negative breast cancer (TNBC) subtypes. San Antonio Breast Cancer Symposium. San Antonio, TX. December 9th-13th, 2014.

Rebecca Smith, Nael Alami, J. Paul Taylor. "Novel Cytoplasmic Roles for the RNA-binding Protein, TDP-43." American Society for Human Genetics. San Diego, CA. October 18th-22nd, 2014

Rebecca Smith, J. Paul Taylor. "Localization and trafficking of TDP-43 in *Drosophila* motor neurons." Society for Neuroscience: 6th Brain Research Conference. Washington D.C.November 10-11, 2011.

Rebecca Smith, J. Paul Taylor. "Localization of TDP-43 in Drosophila motor neurons is dependent on RNA binding." Molecular Mechanisms of Neurodegeneration. Milan, Italy. May 13-15, 2011

Nael Alami, **Rebecca Smith**, J. Paul Taylor. "TDP-43 sub-cellular localization and kinetics of transport in cultured cortical neurons" Molecular Mechanisms of Neurodegeneration. Milan, Italy. May 13 15,2011

Rebecca Smith, Sarah Mische, Thomas Hays, Guillermo Marqués. "BMP Signaling in Drosophila Motoneurons is Regulated by Endocytic Trafficking." Developmental Biology Meeting. UAB Department of Cell Biology. November 9th, 2007

Rebecca Smith, Sarah Mische, Thomas Hays, Guillermo Marqués. "BMP Signaling in Drosophila Motoneurons is Regulated by Endocytic Trafficking." UAB Neuroscience Symposium. Comprehensive Neuroscience Center. October 29-30th, 2007.

Rebecca Smith, Sarah Mische, Thomas Hays, Guillermo Marqués. "BMP Signaling in Drosophila Motoneurons is Regulated by Endocytic Trafficking." Neurobiology of Drosophila meeting. Cold Spring Harbor Laboratories. October 3rd-7th, 2007.

Rebecca Smith, Sarah Mische, Thomas Hays, Guillermo Marqués. "Axonal Transport of BMP signals in Motoneurons." Genetics Departmental Retreat. September 8th,2006.

Rebecca Smith, Sarah Mische, Thomas Hays, Guillermo Marqués. "Traffic of BMP signals in motor neurons." 47th annual Drosophila Research Conference. Houston, TX. March 29th-April 2nd, 2006