Devin R. McCormack, M.S.

Curriculum Vitae

Education

Vanderbilt University – Nashville, TN

Master of Science: Biomedical Engineering - Biomedical Optics/Imaging focus July 2014

Thesis: "*In vivo* hyperspectral imaging of microvessel response to trastuzumab treatment in breast cancer xenografts"

University of Missouri – Columbia, MO

Bachelor of Science: Biological Engineering *Cum Laude* May 2011

Minor: Mathematics

Dean's List: Fall 2007, Fall 2008, Spring 2009, 2010-2011.

Coursera Courses Completed

Machine learning - Stanford University November 2015

Financial Markets - Yale University July 2016

The R Programming Environment - Johns Hopkins University January 2017

Excel to MySQL: Analytic Techniques for Businesses *Specialization*

Business Metrics for Data-Driven Companies - Duke University January 2017

Technical Skills

OS: Mac, Windows

Data Visualization: Excel, PowerPoint, Tableau

Languages: MATLAB, R, Bash, LabView

Research Experience

Research Analyst I (Lab Manager) *Vanderbilt University* August 2014-***Present***

Advisor: Dr. Frank Tong

- Maintains compliance with IRB and handled creation, revision and reviews of IRB for behavioral, fMRI, and EEG experiments with human subjects.
- Used REDCap survey software to port all existing IRB consent forms and questionnaires into a paperless consent structure that easily tabulates experiment information and demographics.
- Facilitates human subject enrollment, consent, and compensation for multiple fMRI, EEG and behavioral studies.
- Uses FSL, Freesurfer, and MATLAB to perform statistical analysis including multiple regression of fMRI BOLD signals.
- Designs psychological studies using Psychtoolbox to probe visual phenomena.
- Develops custom machine learning algorithms for advanced statistical analysis of fMRI data.
- Uses R and MATLAB for advanced statistical modeling and analysis of large datasets.

Graduate Research Assistant *Vanderbilt University* August 2011-August 2014

Advisor: Dr. Melissa C. Skala

- Built custom instrumentation and developed custom processing techniques for optical coherence tomography (OCT) and hyperspectral imaging, applied to quantification of blood oxygenation in microvessels.
- Developed advanced automated signal processing algorithms for high-throughput image analysis and quantification of OCT, hyperspectral, and microscopy images.
- Performed aseptic survival surgery on mice for window implantation, wound, and ischemia modeling.
- Obtained extensive experience with MATLAB and LabVIEW for image processing and GUI development.

Research Assistant *University of Missouri* June 2006 – July 2011

Advisor: Dr. John A. Viator

- Designed and tested instrumentation for photoacoustic detection of melanoma in histological samples and lymph nodes.

- Developed signal processing algorithms to spatially map melanin content in histological samples.
- Demonstrated basic phlebotomy skills including blood draw and fractionation.

Honors and Awards

AHA Greater Southeast Affiliate Winter 2012 Predoctoral Fellowship	2012 – 2014
NSF GRFP Honorable Mention	2012
Lloyd E. Hightower Scholarship	2010 – 2011
Missouri Honor Award – Outstanding Junior in Biological Engineering	2010
Missouri Bright Flight Scholarship	2007 – 2011

Peer Reviewed Publications

1. Crowder S. W., Balikov D. A., Boire T. C., **McCormack D. R.**, Lee J. B., Gupta M. K., Skala M. C., and Sung H. J. "Copolymer-Mediated Cell Aggregation Promotes a Proangiogenic Stem Cell Phenotype *In Vitro* and *In Vivo*," *Advanced Healthcare Materials* **5**(22), 2866-2871, (2016).
2. Poole K. M., **McCormack D. R.**, Patil C. A., Duvall, C. L., and Skala M. C. "Quantifying the vascular response to ischemia with speckle variance optical coherence tomography," *Biomedical Optics Express* **5**(12), 4118-4130, (2014).
3. **McCormack D. R.**, Walsh A. J., Sit W., Arteaga C. L., Chen J., Cook R. S., and Skala M. C. "*In vivo* hyperpsectral imaging of microvessel response to trastuzumab treatment in breast cancer xenografts," *Biomedical Optics Express* **5**(7), 2247-2261*,* (2014).
4. **McCormack D. R.**, Bhattacharyya K., Kannan R., Katti K., and Viator J. A. "Enhanced photoacoustic detection of melanoma cells using gold nanoparticles," *Lasers in Surgery and Medicine* **43**(4), 333–338, (2011).
5. **McCormack D. R.**, Al-Shaer M., Goldschmidt B. S., Dale P. S., Henry C., Papageorgio C., Bhattacharyya K., and Viator J. A. "Photoacoustic detection of melanoma micrometastasis in sentinel lymph nodes," *J. Biomech Eng* **131**(7), 074519, (2009).

Patent Applications

1. Viator J. A., **McCormack D. R.**, and Dale P. S. Photoacoustic detection of analytes in solid tissue and detection system, U.S. 12/763,700, WO/2010/123883, filed April 20, 2010.

Conference Presentations

1. Poltoratski, S., **McCormack D. R.**, and Tong, F. "*Orientation-Tuned Suppression in the Early Visual Pathway,*" *Vision Science Society Annual Meeting.* (St. Pete Beach, Florida 2016). **Poster.**
2. **McCormack D. R.**, Walsh A. J., Sit W., Arteaga C. L., Chen J., Cook R. S., and Skala M. C. "*In vivo* hyperspectral imaging of microvessel response to trastuzumab treatment in breast cancer xenografts," *Vanderbilt Ingram Cancer Center Retreat*. (Nashville, TN 2014). **Poster.**
3. Poole K. M., Patil C. A., Nelson C. E., **McCormack D. R.**, Madonna M. C., Duvall, C. L., Skala M. C., "Longitudinal study of arteriogenesis with swept source optical coherence tomography and hyperspectral imaging," *SPIE BiOS Optical coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII.* (San Francisco, CA 2014).
4. **McCormack D. R.**, Walsh A. J., Sit W, and Skala M. C. "Quantitative measurement of tumor vasculature treatment response using hyperspectral imaging" *Frontiers in Biomedical Imaging*. (Nashville, TN 2013). **Poster.**
5. **McCormack D. R.**, Patil C. A., Tucker-Schwartz J. M., Skala M. C. "Doppler and photothermal optical coherence tomography for quantifying microvessel hemodynamics." *SPIE BiOS Dynamics and Fluctuations in Biomedical photonics VIII.* (San Francisco, CA 2013). **Podium Presentation.**
6. **McCormack D. R.**, Patil C. A., Tucker-Schwartz J. M., Hofmeister L., Skala M. C. "Photothermal Optical Coherence Tomography for Quantifying Blood Oxygen Saturation *in vivo." BMES Annual Meeting 2012.* (Atlanta, GA 2012). **Podium Presentation.**

7. **McCormack D. R.**, Bhattacharyya K., Kannan R., Katti K., Viator J. A., "Enhanced detection of circulating melanoma cells using gold nanoparticles as photoacoustic contrast agents" *SPIE BiOS Photons Plus Ultrasound: Imaging and Sensing 2010.* (San Francisco, CA 2010). **Podium Presentation.**
8. **McCormack D. R.**, and Viator J. A. "Photoacoustic detection of metastatic melanoma in sentinel lymph nodes," *Undergraduate Research and Creative Achievements Forum at the University of Missouri.* (Columbia, MO 2008). **Poster.**
9. **McCormack D. R.**, and Viator J. A. "Photoacoustic detection of metastatic melanoma in sentinel lymph nodes," *Undergraduate Research Day at the Capitol.* (Jefferson City, MO 2009). **Poster**

Conference Proceedings Publications

1. Poole K. M., Patil C. A., Nelson C. E., **McCormack D. R.**, Madonna M. C., Duvall C. L., and Skala M. C. "Longitudinal study of arteriogenesis with swept source optical coherence tomography and hyperspectral imaging," *Proc. SPIE 8934, Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII*, 2014.
2. Poole K. M., Nelson C. E., Martin J. R., **McCormack D. R.**, Joshi R. V., Skala M. C., and Duvall C. L. "Noninvasive Optical Imaging of Response to On-Demand Antioxidant Therapy in a Model of Peripheral Arterial Disease," *AHA Scientific Sessions, Best of Basic Science Abstracts and Reception,* 2014.
3. **McCormack D. R.**, Bhattacharyya K., Kannan R., Katti K., and Viator J. A. "Enhanced detection of circulating melanoma cells using gold nanoparticles as photoacoustic contrasting agents," *Proc. SPIE 7564, Photons Plus Ultrasound: Imaging and Sensing,* 2010.