

Curriculum Vitae

Matthew T. McKenna

M.D./Ph.D. Candidate

Vanderbilt University, School of Medicine

Vanderbilt University, Department of Biomedical Engineering

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Education

- 08/06-05/10 Duke University, Pratt School of Engineering
B.S.E., Biomedical Engineering, Electrical and Computer Engineering (May 2010, cum Laude)
- 06/12-present Vanderbilt University, Medical Scientist Training Program
M.D./Ph.D. Candidate in Biomedical Engineering (Expected 2019)
Thesis Title: Development and Validation of a Predictive Model of Chemotherapy in Triple Negative Breast Cancer

Research Experience

- 06/09-09/09 Research Assistant
Duke Imaging and Spectroscopy Group, Duke University
I conducted preliminary research for gigapixel imager and automated software for spectral image processing.
- 08/10-06/12 Postbaccalaureate Intramural Research Training Award
Ronald Summers, advisor; Imaging Biomarkers and Computer Aided Diagnosis Laboratory, National Institutes of Health, Clinical Center
I developed several technologies to improve radiologist performance when reading CT scans:
- New rendering technique for visualization of polyps in CT Colonography (CTC) (<http://mturk.dreamhosters.com/training.html>)
 - Computer-aided polyp detection system for CTC relying on intraluminal projection images
 - Automated detection of enlarged lymph nodes
- 06/12-07/12 Graduate Rotation Student
Robert Galloway, advisor; Vanderbilt University
I implemented a semi-automated process for kidney stone volume measurement on CT scans.
- 06/13-07/13 Graduate Rotation Student
Vito Quaranta, advisor; Vanderbilt University
I investigated tumor cell heterogeneity utilizing single cell imaging, learning cell culture techniques and gaining experience in automated microscopy.
- 03/14-present NIH Ruth L. Kirschstein National Research Service Award Predoctoral Fellow
Thomas E. Yankeelov, advisor; Vanderbilt University
Leveraging data from fluorescence microscopy and magnetic resonance imaging experiments, I am developing and validating spatiotemporal models for predicting the response of triple-negative breast cancer to chemotherapy in both the *in vitro* and *in vivo* settings

Awards & Honors

- Graduate: 2012 SPIE Medical Imaging Conference Honorable Mention poster award
2014 VICC Retreat First place prize for poster presentation
2014 Travel Award to NCSU Workshop on Parameter Estimation
2014 Thomas Huggins Winn Scholarship Recipient

2015 VICC Retreat Second place prize for poster presentation

2015 Frontiers V Conference Honorable Mention poster award

2016 NIH Ruth L. Kirschstein National Research Service Award Predoctoral Fellowship
(NIH/NCI, Development and Validation of a Predictive Model of Chemotherapy in Breast Cancer)

Undergrad: 6-time Dean's List selection, 2-time Dean's List with Distinction selection, Duke University

Professional Organization Membership

2015-current American Association for Cancer Research, Associate Member

Journal Publications

- 1) M.T. McKenna, S. Wang, T.B. Nguyen, J.E. Burns, N. Petrick, R.M. Summers (2012). "Strategies for improved interpretation of computer-aided detections for CT colonography utilizing distributed human intelligence." *Medical Image Analysis* 16(6), 1280-1292.
- 2) S. Wang, M.T. McKenna, T.B. Nguyen, J.E. Burns, N. Petrick, B. Sahiner, R.M. Summers (2012). "Seeing is Believing: Video Classification for Computed Tomographic Colonography Using Multi-Instance Learning," *IEEE Transactions on Medical Imaging* 31(5), 1141-1153.
- 3) T.B. Nguyen, S. Wang, V. Anugu, N. Rose, M. McKenna, N. Petrick, J.E. Burns, R.M. Summers (2012). "Distributed Human Intelligence for Colonic Polyp Classification in Computer-aided Detection for CT Colonography," *Radiology* 262(3), 824-833.

Conference Proceedings

- 1) S. Wang, M.T. McKenna, Z. Wei, J. Liu, P. Liu, R.M. Summers "Visual Phrase Learning and Its Application in Computed Tomographic Colonography," *Medical Image Computing and Computer-Assisted Intervention – MICCAI 2013*.
- 2) S. Wang, M.T. McKenna, N. Petrick, B. Sahiner, M.G. Linguraru, Z. Wei, J. Yao, R.M. Summers. "ROC-like Optimization by Sample Ranking: Application to CT Colonography," *Proceedings of 2012 IEEE International Symposium on Biomedical Imaging*.
- 3) M.T. McKenna, S. Wang, T.B. Nguyen, J.E. Burns, N. Petrick, B. Sahiner, R.M. Summers, "Computer Vision Approach to Detect Colonic Polyps in Computed Tomographic Colonography," *Proceedings of 2012 SPIE Medical Imaging: Computer-Aided Diagnosis*
- 4) S. Wang, V. Anugu, T. Nguyen, N. Rose, J.E. Burns, M. McKenna, N. Petrick, R.M. Summers. "Fusion of Machine Intelligence and Human Intelligence For Colonic Polyp Detection in CT Colonography," *Proceedings of 2011 International Symposium on Biomedical Imaging*.

Conference Abstracts

- 1) Matthew T. McKenna, Stephanie L. Barnes, Abigail Searfoss, Darren Tyson, Erin Rericha, Vito Quaranta, Thomas E. Yankeelov. "Multiscale Treatment Response Model for Triple-Negative Breast Cancer Linking Drug Pharmacokinetics to Tumor Cell Population Dynamics." AACR Annual Meeting, New Orleans LA (2016)
- 2) Matthew T. McKenna, Stephanie L. Barnes, Darren Tyson, Erin Rericha, Vito Quaranta, Thomas E. Yankeelov. "Multi-scale Treatment Response Model for Triple Negative Breast Cancer Linking Drug Administration Schedules to Tumor Cell Population Dynamics." IMAG Multiscale Modeling Meeting, Bethesda MD (2015).

- 3) Stephanie L. Barnes, Matthew T. McKenna, David A. Hormuth, Jared A. Weis, Lori A. Arlinghaus, Erin C. Rericha, Michael I. Miga, Vito Quaranta, and Thomas E. Yankeelov. "Incorporating Patient-Specific Imaging Data and Therapeutic Regimens to Predict Eventual Response in Locally Advanced Breast Cancer via a Multi-Scale Model." IMAG Multiscale Modeling Meeting, Bethesda MD (2015).
- 4) Matthew McKenna and Thomas Yankeelov. "Evaluating the Effect of Cytotoxic Drugs with Diffusion-Weighted Magnetic Resonance Imaging" National MD/PhD Student Conference, Keystone CO (2015)
- 5) S. Barnes, M. McKenna, D. Hormuth, J. Weis, L. Arlinghaus, X. Li, E. Rericha, D. Tyson, M. Miga, V. Quaranta, T. Yankeelov, "Incorporating Patient-Specific Imaging Data and Treatment Regimes to Predict Treatment Response in a Multi-Scale Model of Treatment Response in Breast Cancer." ISMRM Workshop: MRI in the Management of Breast Disease: Past, Present, & Future, Bethesda MD (2015).
- 6) S. Barnes, M. McKenna, D. Hormuth, J. Weis, M. Miga, T. Yankeelov. "Incorporating Patient-Specific Imaging Data and Treatment Regimes to Predict Treatment Response in a Multi-Scale Model of Treatment Response in Breast Cancer." IMAG Multiscale Modeling Meeting, Bethesda MD (2014).
- 7) M. McKenna, S. Barnes, D. Hormuth, J. Weis, M. Miga, T. Yankeelov. "Sensitivity Analysis of a Tumor Growth Model Parameterized with *in vivo* Imaging Data." IMAG Multiscale Modeling Meeting, Bethesda, MD (2014).
- 8) Thomas Yankeelov, Jared Weis, David Hormuth, Stephanie Barnes, Matthew McKenna, Erin Rericha, Vito Quaranta, and Michael Miga. "*In vivo* Imaging to Drive Patient Specific Tumor Forecasts." *IEEE EMBS Conference of the IEEE Engineering in Medicine and Biology Society*, Chicago, IL (2014).
- 9) Matthew McKenna, Stephanie Barnes, David Hormuth, Erin Rericha, Mike Miga, Vito Quaranta, Thomas Yankeelov. "Sensitivity Analysis of a Tumor Growth Model Parameterized with *in vivo* Imaging Data." *Vanderbilt Integrated Cancer Center Retreat*, Nashville TN (2014).
- 10) Je'Purde White, Xuechao Zhang, Matthew T. McKenna, Jonathan J. Knowlton, Krystian A. Kozek, Jean-Nicolas Gallant. "Shade Tree Clinic Pharmacy." *Society of Student Run Free Clinics Conference*, Nashville TN (2014).
- 11) M.T. McKenna, S. Wang, N. Petrick, R.M. Summers, "Prediction of Ground Truth and Expert Labels using Distributed Human Intelligence in CT Colonography." *Radiological Society of North America*, Chicago IL (2012).
- 12) T.B. Nguyen, S. Wang, M. McKenna, N. Petrick, J.E. Burns, R.M. Summers, "Distributed Human Intelligence for Colonic Polyp Classification in Computer-aided Detection for CT Colonography." *Radiological Society of North America*, Chicago IL (2011).
- 13) M. McKenna, S. Wang, T. Nguyen, N. Petrick, J. Burns, R.M. Summers, "Perceptual Factors in Computer-aided Detection for CT Colonography Utilizing Distributed Human Intelligence" *Medical Image Perception Society Conference*, Dublin Ireland (2011).
- 14) Matthew McKenna. "Fusion of Machine Intelligence and Human Intelligence for Colonic Polyp Detection in CT Colonography," *Crowdsourcing: The Art and Science of Open Innovation*, Bethesda MD (2011).

Reviewer

Served as a reviewer for the 2015 Pacific Symposium on Biocomputing

Community Service

08/12-12/14 Staff member, Finance Department, Shade Tree Clinic, Vanderbilt University

06/14-10/15 Director of Finance, Shade Tree Clinic, Vanderbilt University

I directed a team of eight to oversee several fundraising events, grant applications, and quality improvement projects at the Shade Tree Clinic, a student-run free clinic serving Nashville residents with limited resources. During my tenure as Director, I helped to acquire over \$75,000 in grants and donations to support Clinic activities. We also provided technical support for several research projects, including an effort to investigate the role of patient education in improving medication adherence.