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CURRICULUM VITAE

David G. Mummy, Ph.D.

Primary Appointment: Dept. of Radiology
Present Rank/Title: Post-Doctoral Research Associate

CONTACT INFORMATION

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EDUCATION

University of Wisconsin, Madison, WI
Ph.D., Biomedical Engineering (2018)
M.S., Biomedical Engineering (2015)
Seattle University, Seattle, WA
M.B.A. (2011)
Whitman College, Walla Walla, WA
B.A., Mathematics, Physics (2006)

RESEARCH EXPERIENCE

Post-Doctoral Research Associate, Duke University — Feb 2019 - Present
Department of Radiology and Center for In Vivo Microscopy
Supervisor: Bastiaan Driehuys, Ph.D

Research Assistant, University of Wisconsin-Madison — Sep 2013 - Jan 2019
Department of Medical Physics
Supervisor: Sean B. Fain, Ph.D

INDUSTRY EXPERIENCE

Scientific Consultant — Jan 2020 - Present
Polarean Imaging plc, Durham, NC

Statistical Analyst Programmer — 2011 - 2013
Fred Hutchinson Cancer Research Center, Seattle, WA

Flight Test Software Analyst — 2008 - 2011
The Boeing Company, Seattle, WA

ACTIVITIES AND SERVICE

- ISMRM Hyperpolarized Media Study Group: Trainee Representative, 2020-Present
- ATS Respiratory Structure and Function (RSF) Assembly Web Committee, 2019-present
- Peer Reviewer: *Magnetic Resonance in Medicine*, *Radiology*, *Radiology: Artificial Intelligence*, and *Radiology: Cardiothoracic Imaging*

PUBLICATIONS

1. **David G. Mummy**, Elianna A. Bier, Ziyi Wang, Jennifer Korzekwinski, Lake Morrison, Christina Barkauskas, Robert Tighe, Bastiaan Driehuys, Joseph Mammarappallil. "Quantitative MR Imaging and Spectroscopy of Gas Exchange Abnormalities in Non-Specific Interstitial Pneumonia Using Hyperpolarized 129Xe." [under review, *Radiology*]

2. **David G. Mummy**, Erika M. Coleman, Ziyi Wang, Elianna Bier, Junlan Lu, Bastiaan Driehuys, Yuh-Chin Huang. "Regional Gas Exchange Measured by 129Xe MRI Before and After Bronchodilator Treatment in Chronic Obstructive Pulmonary Disease." [under review, *JMRI*]

3. **David G. Mummy**, Katherine J. Carey, Michael D. Evans, Loren C. Denlinger, Mark L. Schiebler, Ronald L. Sorkness, Nizar N. Jarjour, and Sean B. Fain. "Ventilation Defects on Hyperpolarized Helium-3 MRI in Asthma are Predictive of 2-Year Exacerbation Frequency." Journal of Allergy and Clinical Immunology 164.4 (2020): 831-839, doi: 10.1016/j.jaci.2020.02.029.

4. Jeff Kammerman, Andrew D. Hahn, Robert V. Cadman, Annelise Malkus, **David Mummy**, Sean B. Fain. "Transverse relaxation rates of pulmonary dissolved-phase Hyperpolarized 129Xe as a biomarker of lung injury in idiopathic pulmonary fibrosis." Magnetic Resonance in Medicine 84.4 (2020): 1857-1867.

5. **David Mummy**, Bastiaan Driehuys. "Illuminating Lung Inflammation at the Alveolar Capillary Interface." (Editorial). Journal of Magnetic Resonance Imaging (JMRI): 11 Feb 2020, 51(6):1677-1678. doi: 10.1002/jmri.27086

6. Kamran Poorbahrami, **David G. Mummy**, Sean B. Fain, and Jessica M. Oakes. "Patient-specific Modeling of Aerosol Delivery in Healthy and Asthmatic Adults." Journal of Applied Physiology 127.6 (2019): 1720-1732.

7. Jessica M. Oakes, **David Mummy**, Kamran Poorbahrami, Wei Zha, and Sean B. Fain. "Patient-Specific Computational Simulations of Hyperpolarized 3He MRI Ventilation Defects in Healthy and Asthmatic Subjects". IEEE Transactions in Biomedical Engineering, 66.5 (2018): 1318-1327.

8. Zha, Wei, Stanley J. Kruger, Robert V. Cadman, **David G. Mummy**, Michael D. Evans, Scott K. Nagle, Loren C. Denlinger, Nizar N. Jarjour, Ronald L. Sorkness, and Sean B. Fain. "Regional Heterogeneity of Lobar Ventilation in Asthma Using Hyperpolarized Helium-3 MRI." Academic Radiology 25, no. 2 (2018): 169-178.

9. **David G. Mummy**, Stanley J. Kruger, Wei Zha, Ronald L. Sorkness, Nizar N. Jarjour, Mark L. Scheibler, Loren C. Denlinger, Michael D. Evans, Sean B. Fain."Ventilation defect percent in helium-3 magnetic resonance imaging as a biomarker of severe outcomes in asthma." Journal of Allergy and Clinical Immunology 141.3 (2018).

10. E. Adamson, K. Ludwig, **D. Mummy**, S.B. Fain. "Magnetic resonance imaging with hyper-polarized agents: methods and applications". Physics in Medicine and Biology (2017). doi: 10.1088/1361-6560/aa6be8.

11. Wei Zha, David J. Niles, Stanley J. Kruger, Bernard J. Dardzinski, Robert V. Cadman, **David G. Mummy**, Scott K. Nagle, and Sean B. Fain. "Semiautomated Ventilation Defect Quantification in Exercise-induced Bronchoconstriction Using Hyperpolarized Helium-3 Mag-netic Resonance Imaging: A Repeatability Study". Academic Radiology (2016).

12. V. Shankaran, **D. Mummy**, L. Koepl, A. Bansal, D. Mirick, E. Yu, R. Morlock, S. Ogale, and S. Ramsey. "Survival and lifetime costs associated with first-line bevacizumab use in older patients with metastatic colorectal cancer". Oncologist 19:892-899, 2014

13. V. Shankaran, **D. Mummy**, L. Koepl, D. Blough, Y. M. Yim, E. Yu, S. Ramsey. "Adverse events associated with Bevacizumab and chemotherapy in older patients with metastatic colorectal cancer". Clin Colorectal Cancer 2013; 12(3): 204–213

14. B. Goulart, C. Reyes, C. Fedorenko, **D. Mummy**, S. Satram-Hoang, L. Koepl, D. Blough, S. Ramsey. "Referral and treatment patterns among patients with stages III and IV non-small cell lung cancer". Journal of Oncology Practice, 9, 42-50. doi:10.1200/JOP.2012.000640

15. B. Goulart, M. Bensink, **D. Mummy**, S. Ramsey. "Lung cancer screening with low-dose computed tomography: costs, national expenditures, and cost-effectiveness". Journal of the National Comprehensive Cancer Network: JNCCN. 01/2012; 10(2): 267-275.

Book Chapters

- "Asthma." **David G. Mummy**, Wei Zha, Ronald L. Sorkness, Sean B. Fain. *MRI of the Lung*, Hans-Ulrich Kauczor and Mark Oliver Wielpütz, Eds. Springer, 2018.
- "Hyperpolarized Gas MRI of the Lung in Asthma." Sean B. Fain, **David G. Mummy**, Ronald L. Sorkness. *Hyperpolarized and Inert Gas MRI: From Technology to Application in Research and Medicine*, Mitchell S. Albert and Francis T. Hane, Eds. Academic Press, 2016.

Current Grant Support

Genentech: Tighe (PI) 6/31/2019 - 12/31/2022

^{129}Xe Imaging Biomarkers for Idiopathic Pulmonary Fibrosis

This study deploys ^{129}Xe gas exchange MRI at baseline, 3 months, 6 months and 12 months in patients starting on treatment with antifibrotic therapies to determine whether ^{129}Xe biomarkers at baseline and 3 months predict traditional outcomes at 12 months.

Role: Co-Investigator

Genentech: Driehuys/Huang (PI) 9/31/20 - 3/21/23

^{129}Xe MRI Assessment of Disease Progression in Patients with COPD Treated with Standard of Care with or without Open-Label Azythromycin to prevent Acute Exacerbations.

This study will use ^{129}Xe gas exchange MRI at baseline, 3 months, 6 months and 12 months to identify imaging biomarkers that predict response to azythromycin.

Role: Co-Investigator, Core Imaging Lab

Completed Grant Support

Kaganov Initiative: Mammarappallil (PI) 1/31/2019 - 1/30/2020

Utilization of Hyperpolarized ^{129}Xe MRI with Machine Learning to Diagnose Idiopathic Pulmonary Fibrosis

This project combines ^{129}Xe gas exchange MRI with machine learning and transfer learning approaches to distinguish IPF from other fibrotic diseases.

Role: Co-Investigator

United Therapeutics: Rajagopal (PI) 6/30/18 - 5/31/20

Assessing Response to Inhaled Prostacyclin with Hyperpolarized ^{129}Xe MRI

The goals of this project are to determine whether dynamic spectroscopy and ^{129}Xe gas exchange MRI can detect both initial response to inhaled Prostacyclin and recovery back to baseline as the drug washes out.

Role: Co-Investigator

Presentations

- International Workshop on Pulmonary Functional Imaging, New Orleans, LA — Oct 2019
- American Thoracic Society International Conference, San Diego, CA — May 2018
- International Society for Magnetic Resonance Imaging, Honolulu, HI — May 2017
- American Thoracic Society International Conference, San Francisco, CA — May 2016
- Intl. Workshop on Pulmonary Functional Imaging, Edinburgh, Scotland — Sep 2015

Awards

Abstract Awards

- Summa cum laude abstract, ISMRM Honolulu — April 2017
- Student Prize (North America)
  Intl. Workshop on Pulmonary Functional Imaging, Edinburgh — Sep 2015
- Abstract Scholarship, ATS Denver — Oct 2014