

CURRICULUM VITAE

Jered R Wells, PhD, DABR
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Diplomate, American Board of Radiology (DABR) 2019
Mammography Quality Standards Act (MQSA) 2018

EDUCATION

College	Central College	B.A. (<i>Summa Cum Laude</i>) Physics Pella, IA	2008
Graduate School	Duke University	Ph.D. Medical Physics Durham, NC	2013

SCHOLARLY SOCIETIES

American Association of Physicists in Medicine (AAPM)	2009 –
Southeast Chapter of the AAPM	2009 –
International Society for Optics and Photonics (SPIE)	2009 – 2013

PROFESSIONAL TRAINING AND ACADEMIC CAREER

Duke University Medical Center, Durham, NC Clinical Imaging Physics Group (CIPG) Radiation Physicist	2013 –
Duke University, Durham, NC Medical Physics Graduate Program Faculty	2016 –

ADDITIONAL TRAINING AND INTERNSHIPS

University College London, London, U.K. Department of Cognitive, Perceptual, and Brain Sciences Laboratory Assistant	2005
West Virginia University, Morgantown, WV Blanchette Rockefeller Neurosciences Institute MRI Research Assistant	2007
University of Wisconsin, Madison, Madison, WI Department of Medical Physics Visiting Scholar and Graduate Researcher	2011

PUBLICATIONS

<https://scholars.duke.edu/person/jered.wells> unabridged

* Denotes co-first authorship

Refereed journal publications:

- J1. Lemieux, S. K., Smith-Bell, C. A., **Wells, J. R.**, Ezerioha, N. M., Carpenter, J. S., Sparks, D. L., Schreurs, B. G. (2010) Neurovascular changes measured by time-of-flight MR angiography in cholesterol-fed rabbits with cortical amyloid beta-peptide accumulation. *J Magn Reson Imaging* 32(2): 306-314.
- J2. **Wells, J. R.**, Dobbins, J. T. III. (2012) Estimation of the two-dimensional presampled modulation transfer function of digital radiography devices using one-dimensional test objects. *Medical Physics* 39(10): 6148-6160.
- J3. **Wells, J. R.**, Dobbins, J. T. III. (2013). Frequency response and distortion properties of nonlinear image processing algorithms and the importance of imaging context. *Medical Physics* 40(9): 091906.
- J4. Erickson, D. W., **Wells, J. R.***, Sturgeon, G. M., Samei, E., Dobbins, J. T. III, Segars, W. P., Lo, J. Y. (2016) Population of 224 realistic, human subject-based computational breast phantoms. *Medical Physics* 43(1): 23-32.
- J5. Nelson, J. S., **Wells, J. R.**, Baker, J. A., Samei, E. (2016). How does C-View image quality compare with conventional 2-D FFDM? *Medical Physics* 43(5): 2538-2547. [Medical Physics Editors' Choice and MedicalPhysicsWeb Featured Article - <http://medicalphysicsweb.org/cws/article/research/65203>]
- J6. Carver, D. E., Willis, C. E., Stauduhar, P. J., Nishino, T. K., **Wells, J. R.**, Samei, E. (2018) Medical physics 3.0 versus 1.0: A case study in digital radiography quality control. *Journal of Applied Clinical Medical Physics* 19(10): 694-707.
- J7. Mann, S. D., Joshi, A., Shonyo, M., **Wells, J. R.**, Hoye, J., Agasthya, G., Reiman, R., Samei, E. (2018) Improved Dose Estimates for Fluoroscopically Guided Lumbar Epidural Injections. *Pain Medicine* 20(5): 971-978.
- J8. Willis, C. E., Nishino, T. K., **Wells, J. R.**, Asher Ai, H., Wilson, J. M., Samei, E. (2018) Automated quality control assessment of clinical chest images. *Medical Physics* 45(10): 4377-4391.

Refereed full-length proceedings papers:

- P1. Dobbins, J. T. III, **Wells, J. R.**, Segars, W. P., Li, C. M., Kigongo, C. J. N. (2010) Initial investigation into lower-cost CT for resource limited regions of the world. *Proc. SPIE Medical Imaging* 7622: 76223C.
- P2. **Wells, J. R.**, Segars, W. P., Kigongo, C. J. N., Dobbins, J. T. III. (2011) Refinement of motion correction strategies for lower-cost CT for under-resourced regions of the world. *Proc. SPIE Medical Imaging* 7961: 796133.

- P3. Dobbins, J. T. III, **Wells, J. R.** (2011) Correlated-polarity noise reduction: feasibility of a new statistical approach to reduce image noise. *Proc. SPIE Medical Imaging* 7961: 79610A.
- P4. Dobbins, J. T. III, **Wells, J. R.**, Segars, W. P. (2013) Dose reduction in CT with correlated-polarity noise reduction: comparable image quality at half the dose with projection space processing. *Proc. SPIE Medical Imaging* 8668: 86681O-6.
- P5. **Wells, J. R.**, Dobbins, J. T. III. (2013) Preliminary investigation of the frequency response and distortion properties of nonlinear image processing algorithms. *Proc. SPIE Medical Imaging* 8668: 86681H.
- P6. Segars, W. P., Veress, A. I., **Wells, J. R.**, Sturgeon, G. M., Kiarashi, N., Lo, J. Y., Samei, E., Dobbins, J. T. III. (2014) Population of 100 realistic, patient-based computerized breast phantoms for multi-modality imaging research. *Proc. SPIE Medical Imaging* 9033: 90331X-6.
- P7. Dobbins, J. T. III, **Wells, J. R.**, Segars, W. P. (2014) Dose reduction in CT with correlated-polarity noise reduction: context-dependent spatial resolution and noise properties demonstrating two-fold dose reduction with minimal artifacts. *Proc. SPIE Medical Imaging* 9033: 90335G-8.

Conference abstracts and presentations:

- A1. **Wells, J. R.**, Segars, W. P., Frush, D. P., McAdams, H. P., Kigongo, C. J. N., Dobbins, J. T. III. (2010) A post-acquisition motion correction strategy for lower-cost computed tomography for the developing world. NIBIB Training Grantees Meeting, Bethesda, MD, June 2010.
- A2. **Wells, J. R.**, Segars, W. P., Kigongo, C. J. N., Dobbins, J. T. III. (2010) A new approach to motion correction applied to lower-cost CT for the developing world. Memphis Bioimaging Symposium, Memphis TN, November 2010. [**Honorable Mention**]
- A3. **Wells, J. R.**, Dobbins, J. T. III. (2012) Estimation of the 2-D presampled MTF of a digital flat panel detector system using an edge test device. Proceedings of the Annual Meeting of the American Association of Physicists in Medicine, Charlotte, NC, July 2012, *Medical Physics* 39(6): 3894.
- A4. **Wells, J. R.**, Wilson, J. M., Zhang, Y., Samei, E., Ravin, C. E. (2014) Automated Image Quality Assessment of Radiographic Systems Using An Anthropomorphic Phantom. Proceedings of the Annual Meeting of the American Association of Physicists in Medicine, Austin, TX, July 2014, *Medical Physics* 41(6): 152-152.
- A5. Nelson, J. S., **Wells, J. R.**, Samei, E. (2015) Intrinsic Image Quality Comparison of Synthesized 2-D and FFDM Images. Proceedings of the Annual Meeting of the American Association of Physicists in Medicine, Anaheim, CA, July 2015, *Medical Physics* 42(6): 3611-3612.

- A6. **Wells, J. R.**, Christensen, J. D., Samei, E. (2015) A Consumer Report for Mobile Digital Radiography: A Holistic Comparative Evaluation Across Four Systems. Proceedings of the Annual Meeting of the American Association of Physicists in Medicine, Anaheim, CA, July 2015, *Medical Physics* 42(6): 3720-3720.
- A7. **Wells, J. R.**, Zhang, L., Samei, E. (2015) Automated Characterization of Perceptual Quality of Clinical Chest Radiographs: Improvements in Lung, Spine, and Hardware Detection. Proceedings of the Annual Meeting of the American Association of Physicists in Medicine, Anaheim, CA, July 2015, *Medical Physics* 42(6): 3695-3695.
- A8. Willis, C. E., Nishino, T. K., **Wells, J. R.**, Wilson, J. M., Samei, E. (2015) Medical Physics 2.0 in Practice: Automated QC Assessment of Clinical Chest Images. Proceedings of the Annual Meeting of the American Association of Physicists in Medicine, Anaheim, CA, July 2015, *Medical Physics* 42(6): 3695-3696.
- A9. Carver, D. E., Willis, C. E., Stauduhar, P., Nishino, T. K., **Wells, J. R.**, Samei, E. (2016) Objective Image Quality Metrics Versus Automated Quality Assurance Tests for Monitoring DR System Performance. Southwest Chapter of American Association of Physicists in Medicine Spring Meeting, New Orleans, LA, March 2016.
- A10. Carver, D. E., Willis, C. E., Stauduhar, P., Nishino, T. K., **Wells, J. R.**, Samei, E. (2016) Medical Physics 1.0 Versus Medical Physics 2.0: A Case Study. Proceedings of the Annual Meeting of the American Association of Physicists in Medicine, Washington D. C., July 2016, *Medical Physics* 43(6): 3762.
- A11. Jiang, B., **Wells, J. R.**, Samei, E., Nelson, R. Optimization of a Frequency-Based Fusion Technique for Improving the Image Quality on Low Energy Virtual Monochromatic Images from Dual-Energy CT. Society of Computed Body Tomography & Magnetic Resonance. Salt Lake City, UT, September 2016. [Moncada Young Investigator Award]
- A12. Mann, S. D., Joshi, A., Elliott, M., Hoye, J., **Wells, J. R.**, Agasthya, G., Reiman, R., Samei, E. (2017) TU-C3-GePD-I-02: Improved Patient Entrance DAP Estimates for Fluoroscopically-Guided Lumbosacral Epidural Injections. *Medical Physics* 44(6): 3120-3121.
- A13. **Wells, J. R.**, Mann, S. D., Samei, E. (2017) Advanced methods for the development of system-specific and size-specific radiographic technique charts across the radiology enterprise. *Medical Physics* 44(6): 3195-3196.
- A14. **Wells, J. R.**, Samei, E. (2017) Initial investigation of a vendor-neutral approach to ongoing patient chest image quality assessment," *Medical Physics* 44(6): 3266.

Other publications:

- O1. Kanal, K. M., Butler, P. F., Sengupta, D., Bhargavan-Chatfield, M., Coombs, L. P., Morin, R. L. (2017) U.S. Diagnostic Reference Levels and Achievable Doses for 10 Adult CT Examinations. *Radiology* 284(1): 120-133. [Acknowledgement of contributions]

Invited lectures:

- I1. **Wells, J. R.**, Segars, W. P., Frush, D. P., McAdams, H. P., Kigongo, C. J. N., Dobbins, J. T. III. A post-acquisition motion correction strategy for lower-cost computed tomography for the developing world. NIBIB Training Grantees Meeting, Bethesda, MD, June 2010.
- I2. **Wells, J. R.**, Dobbins, J. T. III. A closed-form, analytical solution to 3-D motion correction in lower cost CT. MEDPHY 370: Frontiers in Biomedical Science, Duke University, Durham, NC, April 2012.
- I3. **Wells, J. R.**, Dobbins, J. T. III. Correlated Polarity Noise Reduction: A Nonlinear Image Processing Algorithm for CT Dose Reduction. MEDPHY 251: Seminars in Medical Physics, Duke University, September 2012.
- I4. **Wells, J. R.** Correlated Polarity Noise Reduction: Comparable image quality at half the dose. Radiology Grand Rounds, Duke University Medical Center, Durham, NC, April 2014.
- I5. **Wells, J. R.**, Wilson, J. M., Nelson, J. S., Winslow, J. F. How Medical Physics Impacts Clinical Practice. Technologist Week Professional Seminars, Duke University Medical Center, November 2014.
- I6. **Wells, J. R.** Image Quality Optimization: From Exposure- to Phantom- to Patient-Based Methods in X-ray and CT. Technologist Week Professional Seminars, Duke University Medical Center, November 2015.
- I7. **Wells, J. R.** Practiced Dose and Quality Management in Radiography. International Atomic Energy Agency (IAEA) Scientific Workshop, Duke University, October 2016.

Theses:

- T1. **Wells, J. R.** Image Analysis: Building a Rabbit MRI Brain Atlas. Undergraduate Thesis, Central College, Pella, IA, May 2008.
- T2. **Wells, J. R.** Correlated Polarity Noise Reduction: Development, Analysis, and Application of a Novel Noise Reduction Paradigm. Doctoral Dissertation, Duke University, Durham, NC, December 2013.

PROFESSIONAL APPOINTMENTS**Academic Appointments**

Duke University Medical Physics Graduate Program, Durham, NC

- Faculty, Medical Physics Graduate Program 2016 –
- New Programs Task Force Chair 2015 – 2019

Duke Clinical Imaging Medical Physics Residency, Durham, NC

- Resident mentor/advisor 2013 –
- Imaging Physics Residency Review Committee 2016 –

Consultant Appointments

SafeRay Spine, LLC, Durham, NC 2009 – 2010

- LessRay – Fluoroscopy dose reduction product
- Imaging physics and computer programming consult

JOURNAL SERVICES

Medical Physics (Referee) 2012 –

PROFESSIONAL AWARDS AND SPECIAL RECOGNITIONS

Duke University, Durham, NC

Duke Medical Physics PhD Fellowship	2008 – 2009
NIH Cross-disciplinary Training Grant in Medical Physics (TG32 EB007185)	2009 – 2011
Excellence in Teaching Assistantship Award (Medical Physics)	2011, 2012
Carey E. Floyd Graduate Fellowship (Medical Physics)	2012
Certificate in College Teaching	2013
Director’s Award for Exemplary Service (Medical Physics)	2013

TEACHING RESPONSIBILITIES

Central College, Pella, IA

Upward Bound Pre-College Program 2005

- Taught introductory college-level physics and calculus
- Designed physics laboratories covering general mechanics
- Served as resident adviser and coach

General Physics I (PHYS 111) and II (PHYS 112) 2006 – 2008

- Teaching assistant and laboratory instructor
- Directed weekly help sessions including practice quizzes and tests
- Graded papers, homework, quizzes, and tests

Duke University, Durham, NC

Advanced Medical Imaging Physics (MEDPHY 331) 2010 – 2011

- Teaching assistant with regular office hours and test review sessions
- Wrote homework assignments
- Graded assignments, tests, and presentations

Clinical Practicum and Shadowing (Diagnostic Imaging) (MEDPHY 792) 2014 – 2016

- Co-instructor responsible for teaching general radiography
- Lead classroom instruction, discussion, and clinical practicum and shadowing

Clinical Practicum and Shadowing (Diagnostic Imaging) (MEDPHY 733k) 2015 –2016

- Co-instructor responsible for teaching general radiography
- Lead classroom instruction, discussion, and clinical practicum and shadowing
- Basis in “Medical Physics 2.0” education

Diagnostic Physics Course for Radiology Residents 2015 –

- Co-instructor responsible for teaching radiographic physics to radiology residents

Advanced Topics of Ionizing Based Imaging Modalities (MEDPHY 732) 2017 –

- Co-instructor responsible for teaching general radiography practicum sessions
- Lead classroom instruction, discussion, and clinical practicum and shadowing

TRAINEE MENTORSHIP

- Yakun Zhang, MS – Duke CIPG Medical Physics Resident 2013 – 2016
- Lei Zhang, MS – Duke Medical Physics Graduate Program 2014 – 2015
- Brian Jiang, MS – Duke University School of Medicine 2015 – 2016
- Tamar Chighvinadze, MS – Duke CIPG Medical Physics Resident 2015 – 2016
- Tian Li, BS – Duke Medical Physics Graduate Program 2015 – 2016
- Megan K. Russ, PhD – Duke CIPG Medical Physics Resident 2017 – 2019
- James R. Spencer, PhD – Duke CIPG Medical Physics Resident 2017 – 2019
- David W. Erickson, PhD – Duke CIPG Medical Physics Resident 2017 – 2019
- Crystal A. Green, PhD – Duke CIPG Medical Physics Resident 2019 –

EXTERNAL SUPPORT

1. Title: “Automated Image Quality Assessment Utilizing Machine Learning in Clinical Chest Projection Imaging in Young Children”
 PI: Gary Robert Schooler, M.D.
 Agency: Society for Pediatric Radiology (SPR)
 Period: July 01, 2018 – December 31, 2019
 Funding: \$10,000
 Goal: The goal of this project is to use deep convolutional neural networks to enable efficient auto-segmentation of the lungs for input into our algorithmic evaluation software. Additionally, machine learning will be used to correlate the spectrum of algorithm generated image quality metrics with radiologist generated image quality preferences, ultimately aimed at formulating a portfolio of features, including weighting factors, towards optimization of the automated review paradigm.

CLINICAL ACTIVITIES

Duke University Medical Center, Durham, NC

Radiation Physicist – Clinical Imaging Physics Group (CIPG) 2013 –

- Primary appointments in general radiography, mammography, and fluoroscopy
- Experience testing radiography, mammography, fluoroscopy, CT, MRI, ultrasound, and primary medical displays
- CIPG task group appointments in patient image quality metrology, phantom image quality metrology, key performance indicator (KPI) development, and imaging physics residency
- Supported activities include characterization of inherent properties of imaging equipment (acceptance testing, quality control, accreditation), trouble shooting, and purchase specification, but also significant focus on the new areas of protocol definition, operational optimization, quantitative imaging, and retrospective monitoring and evaluation of clinical performance (dose and clinical image quality)

- Generated a “Consumer Report” template for holistic comparative evaluation of imaging technologies – piloted in mobile radiography
- Wrote algorithms for automated analysis of mammography (ACR) and radiography (“Duke Phantom”) quality assurance phantoms
- Produced an advanced CT scout segmentation program now employed by the ACR Dose Index Registry [in https://pubs.rsna.org/doi/10.1148/radiol.2017161911?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed]
- Developed a vendor-neutral patient image-based AP/PA chest image quality algorithm
- Created and deployed an enterprise-wide radiographic technique chart designed to deliver detector-specific target exposure using machine-specific parameters
- Engaged physicians in image processing optimization for mobile radiographic chest images across eight system models from five vendors

COMMUNITY ACTIVITIES

Excelsior Classical Academy, Durham, NC

Parent Teacher Forum Board Member	2015 – 2018
• Primary Grade Representative	2015 – 2017
• Mediation Committee Chair	2015 – 2017
• Bylaws Committee Chair	2016 – 2017
• Secretary	2017 – 2018