

# Stephen M. Humphries

Humphriess@NJHealth.org

## EDUCATION

- 5 / 2015                      Ph.D., Department of Bioengineering  
University of Colorado Denver  
Dissertation: Quantitative Analysis of Lung CT
- 5 / 2012                      M.S., Department of Bioengineering  
University of Colorado Denver  
Research: Analysis of Pediatric Airway Morphology on CT
- 12 / 1996                     M.S., Medical Physics  
University of Colorado Health Sciences Center  
Research: Automated Analysis of Radiotherapy Portal  
Images Using an Artificial Neural Network
- 5 / 1993                      B.A. (Honors and Distinction), Physics  
Connecticut College, New London, CT  
Honors Thesis: 3D Radiation Dosimetry Using Polymer Gels

## EXPERIENCE

- 3 / 2015 - present            Assistant Professor, Imaging Scientist  
Dept. of Radiology, National Jewish Health, Denver, CO
- 8 / 2012 - 2 / 2015           Research Affiliate, Quantitative Imaging Lab  
Dept. of Radiology, National Jewish Health, Denver, CO
- 5 / 2006 - 7 / 2010           Medical Physicist  
Rocky Mountain CyberKnife, Boulder, CO  
Denver CyberKnife, Lone Tree, CO
- 11 / 2003 - 3 / 2006           Director of Business Development  
Medical Modeling, Golden, CO
- 1 / 2002 - 10 / 2003           Product Manager, Academic Affiliations  
Stryker Navigation, Kalamazoo, MI
- 11 / 1999 - 12 / 2001        Senior Specialist - Stereotactic and Image Guided Surgery  
Stryker Leibinger, Kalamazoo, MI
- 4 / 1998 - 11 / 1999           Assistant Professor, Medical Physicist  
Department of Radiation Oncology,  
University of Colorado Health Sciences Center, Denver, CO

- 9 / 1996 - 3 / 1998           Instructor, Medical Physicist  
Department of Radiation Oncology,  
University of Colorado Health Sciences Center, Denver, CO
- 8 / 1994 - 9 / 1996           Junior Medical Physicist  
Department of Radiation Oncology,  
University Hospital, Denver, CO

## PUBLICATIONS

### Refereed Journal Articles

Humphries SM, Boyd K, Cornish P, Newman FD: "Comparison of Super-Stuff to paraffin wax bolus in radiation therapy of irregular surfaces", **Medical Dosimetry**, 1996 Fall;21(3):155-7.

Rabinovitch R, Finlayson C, Pan Z, Lewin J, Humphries S, Biffi W, Franciose R. : "Radiographic evaluation of surgical clips is better than ultrasound for defining the lumpectomy cavity in breast boost treatment planning: a prospective clinical study.", **International Journal of Radiation Oncology, Biology, and Physics**, 2000 May 1;47(2):313-7.

Berry J, O'Malley BW, Humphries SM, Staecker H: "Making image guidance work: understanding control of accuracy", **Ann Otol Rhinol Laryngol**. 2003 Aug;112(8):689-92.

Eckhoff DG, Bach JM, Spitzer VM, Reinig KD, Bagur MM, Baldini TH, Rubinstein D, Humphries SM: "Three-dimensional morphology and kinematics of the distal part of the femur viewed in virtual reality. Part II", **J Bone Joint Surg Am**. 2003;85-A Suppl 4:97-104.

Christensen AM, Humphries SM, Goh KY, Swift D: "Advanced 'tactile' medical imaging for separation surgeries of conjoined twins.", **Childs Nerv Syst**. 2004 Aug;20(8-9):547-53.

### Book Chapters

Lodwick W, Newman FD, McCourt SL, Humphries SM: "Optimization methods for radiation therapy plans", in **Computational Radiology and Imaging: Therapy and Diagnostics**, The IMA Volumes in Mathematics and its Applications Vol. 110, Springer-Verlag, 1998.

Christensen AM and Humphries SM: "Role of rapid digital manufacture in planning and implementation of complex medical treatments." **Advanced Manufacturing**

**Technology for Medical Applications: Reverse Engineering, Software Conversion and Rapid Prototyping** (2006): 15-30.

### **Manuscripts in Submission**

Humphries SM, Hunter KS, Shandas R, Deterding R, DeBoer E: "Analysis of Pediatric Airway Morphology Using Statistical Shape Modeling", **Medical and Biological Engineering and Computing**

### **Manuscripts in Preparation**

Humphries SM, Schroeder J, Yagihashi K, Huckleberry J, Lynch DA: "Unsupervised feature learning for detection and quantification of pulmonary fibrosis on CT"

Humphries SM, Yagihashi K, Huckleberry J, Rho BH, Schroeder J, Flaherty KR, Schwarz MI, Kazerooni EA, van Beek EJR, Lynch DA: "Idiopathic pulmonary fibrosis: automatic assessment of extent of fibrosis on CT"

### **HONORS AND AWARDS**

5 / 2012 Outstanding Graduate Student in Bioengineering  
University of Colorado Denver

9 / 2006 NSF Science and Engineering Visualization Challenge  
1<sup>st</sup> Place Interactive Media Category  
"Cerebral Vasculature of Conjoined Twins"

5 / 1993 David Fenton Award for Excellence in Physics  
Connecticut College

### **CONFERENCE PRESENTATIONS:**

Humphries SM, Cline HJ, Newman FD: "Evaluation of portal images using artificial neural networks", Fourth International Workshop on Electronic Portal Imaging, June 1996, Amsterdam, The Netherlands (oral).

Mutic S, Humphries SM, Brown M, Newman FD: "Verification of a commercially available linac-based stereotactic radiosurgery system using a BANG-2 polymer gel dosimeter and MRI", 38th Meeting of the American Association of Physicists in Medicine, July 1996, Philadelphia, PA (oral).

Humphries SM, Taylor D, Cline HJ, and Newman FD: "Evaluation of portal images using a counterpropagation neural network", 39th Meeting of the American Association of Physicists in Medicine, July 1997, Milwaukee, WI (oral).

Humphries SM, Koss JE, Hibbard JS, and Newman FD: "A multi-architecture, connectionist approach to automated segmentation of CT images for radiotherapy planning", 39th Meeting of the American Association of Physicists in Medicine, July 1997, Milwaukee, WI (oral).

Newman FD, Holder A, Humphries SM, McCourt SL: "A Robust linear programming approach to the optimal placement and intensity of radiotherapy beams in the treatment of benign and malignant lesions", International Symposium on Mathematical Programming, August 1997, Lausanne, Switzerland (oral).

Newman FD, Tollenaar B, McCourt SL, Humphries SM: "Clinical Implementation of an inverse planning system", CMS Users' Symposium, St. Louis, MO, April 1998 (oral).

Rabinovitch RA, Humphries SM, et al: "Superiority of radio-opaque clips compared to ultrasound as methods of defining lumpectomy cavity volumes for breast boost planning", 40th Meeting of the American Association for Therapeutic Radiology and Oncology, 1998 (oral).

Newman FD, Humphries SM, et al: "A multi resolution global optimization scheme applied to active contours for edge finding in medical images", Meeting of the Society for Industrial and Applied Mathematics, May, 1999 (oral).

Staecker H, O'Malley B, Humphries SM, Berry J: "Effect of fiducial placement on accuracy of image-guided surgery", Amer Acad Otolaryng Surg, 2002 (oral).

Eckhoff DG, Bach JM, Baldini TH, Spitzer VM, Reinig KD, Bagur MM, Humphries SM, Flannery NP: "3D Morphology and Kinematics of the Distal Femur Viewed in Virtual Reality", 70th Annual Meeting of the American Academy of Orthopedic Surgeons, February 2003 (oral).

Humphries SM and Christensen AM: "Use of 3D Printed Anatomical Phantoms with Image Guidance for Training and Surgical Rehearsal", Computer Assisted Radiology, Chicago, 2004 (poster).

Humphries, SM: "Co-Registration of Multi-Modal Image Data for Development of Complex 3D Printed anatomical models", 2<sup>nd</sup> International Conference on Advanced Digital Technologies for Head and Neck Reconstruction, 2005 (oral).

Humphries SM, Christensen AM, Bradrick JP: "Cone Beam Versus Conventional CT: Comparative Analysis of Image Data and Segmented Surface Models", 12<sup>th</sup> Computed Maxillofacial Imaging Congress, 2006 (oral).

Humphries SM, Taylor DD: "CyberKnife Mechanical Accuracy Measured With An Optical Tracking System: Characterization Of Method And Initial Results", CyberKnife Users' Group Meeting 2007, Palm Springs, CA (oral).

Humphries SM, Taylor DD: "A Novel Technique to Measure Motion Tracking Accuracy in Robotic Radiosurgery", Congress of the International Stereotactic Radiosurgery Society, Seoul, South Korea, June 2009 (oral).

DeBoer E, Humphries SM, Shandas R, Deterding R: "Variance of Airway Size and Angle Measured on CT of Normal Children", American Thoracic Society, San Francisco, May 2012 (poster).

Humphries SM, DeBoer E, Hunter K, Shandas R, Deterding R: "Analysis of Pediatric Airway Morphology Using Statistical Shape Modeling", American Thoracic Society, Philadelphia, PA, May 2013 (poster).

DeBoer E, Deterding R, Humphries SM: "Do Children With CF Have Airways Shaped Differently Than Other Children Based on CT?", North American Cystic Fibrosis Conference, Salt Lake City, UT, October 2013 (poster).

Humphries SM, Yagihashi K, Schroeder J, Hunter K, Lynch D: "Classification of Usual Interstitial Pneumonia Pattern on Computed Tomography using a Novel Combination of Image Texture Descriptors", Pulmonary Fibrosis Foundation Summit, La Jolla, CA, December 2013 (poster).

Humphries SM, Yagihashi K, Schroeder J, Huckleberry J, Sood R, Hunter K, Lynch D: "Volumetric Quantification of Usual Interstitial Pneumonia Pattern on Computed Tomography using Spin Image Texture Descriptors", American Thoracic Society, San Diego, CA, May 2014 (poster).

Humphries SM, Yagihashi K, Sood R, Schroeder J, Rho BH, Lynch D: "Quantification of IPF on Chest CT using Unsupervised Feature Learning", American Thoracic Society, Denver, CO, May 2015 (poster).

Ginsburg SB, Zhao J, Humphries SM, Yagihashi K, Lynch D, Schroeder J: "Automated Texture-based Quantification of Centriloblar Emphysema and Centrilobular Nodularity in Non-Smokers, Former Smokers and Current Smokers", American Thoracic Society, Denver, CO, May 2015 (poster).

Yagihashi K, Lynch D, Huckleberry J, Zach J, Humphries SM, Yow E, Flaherty KR, Tschirren J, van Beek EJ, Kazerooni E, Anstrom K, Schwarz ML, and the IPFNet Investigators: "Quantitative CT Analysis and Survival in Idiopathic Pulmonary Fibrosis", American Thoracic Society, Denver, CO, May 2015 (oral).

## **CAMPUS AND DEPARTMENTAL PRESENTATIONS**

- 1 / 2015 "Automatic quantification of lung fibrosis on CT", Imaging Research in Progress, Dept. of Radiology, National Jewish Health
- 5 / 2014 "Random Forest: Applications in bioengineering", Research in Progress, Dept. of Bioengineering, Univ. of Colorado Denver
- 5 / 2014 "Unsupervised feature learning for image texture classification", Imaging Research in Progress, Dept. of Radiology, National Jewish Health
- 9 / 2013 "Statistical shape modeling of pediatric airways", Research in Progress, Dept. of Bioengineering, Univ. of Colorado Denver
- 8 / 2013 "Textural analysis of IPF on CT", Imaging Research in Progress, Dept. of Radiology, National Jewish Health

### **PROFESSIONAL MEMBERSHIPS**

- 2013 - present American Thoracic Society
- 2006 - present American Association of Physicists in Medicine

### **REVIEWING ACTIVITIES**

- 2015 - present ad hoc reviewer, Medical and Biological Engineering and Computing