Nathan S. Hageman

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Education

M.D., *David Geffen School of Medicine at UCLA,* Los Angeles, California.
Dates Attended: August 2001 – August 2003; August 2012 – June 2014

Ph.D., *University of California at Los Angeles (UCLA),* Los Angeles, California.
Dates Attended: August 2003 – August 2011
Field: Neuroengineering/Neuroscience

B.A, *Johns Hopkins University,* Baltimore, Maryland.
Dates Attended: August 1995 – May 2001
Majors: Chemistry, Biology, Physics

--, *Peabody Conservatory of Music,* Baltimore, Maryland.
Dates Attended: August 1996 – May 2001
Major: Music Composition

Awards

UCLA Dissertation Year Fellowship (July 2010 – July 2012)
Competitive merit-based fellowship awarded by the UCLA Graduate Division to the top graduate students in the University who are in their final dissertation year, providing full tuition and fees plus a stipend for one year.

Organization for Human Brain Mapping Travel Fellowship (June 2009 & June 2003)
Award given the top student-submitted abstracts to cover travel expenses to the annual meeting.

AAAS Program for Excellence in Science (August 2006 – August 2008)
Award of a two-year membership in AAAS and full two-year subscription to Science, given to recognize extraordinary students and young investigators in the life sciences.

Thomas C. Carrel Scholarship (August 2005)
Need-based scholarship given to UCLA medical students

UCLA School of Medicine Department of Pathology - Letter of Distinction (May 2002)

Honor given for an extraordinary academic performance in the second-year medical school pathology course.

Grants

R21 NIH/NIA Grant
Role: Co-Investigator/Co-Author
Funding Duration: August 2011 – August 2013
PI: Jonathan Wisco, Ph.D.
Purpose: To develop a co-registered histologic and medical imaging atlas, along with computational tools, for the study of the neuropathology of Alzheimer's disease.

UCLA Medical Scientist Training Program (MSTP) Grant (NIH Grant GM08042)
Role: Fellowship Recipient
Funding Duration: August 2001 – August 2004; August 2012 – Present

P41 Supplement Stimulus (ARRA) Grant
Role: Graduate Student Researcher/Author
Funding Duration: July 2009 – July 2011
PI: Arthur W. Toga, Ph.D.
Purpose: Development of validation tools for diffusion tensor imaging.

IDDRC P30 Center Grant: Pilot research award
Role: Graduate Student Researcher/Co-Author
Funding Duration: July 2009 – July 2010
PI: Jean de Vellis, Ph.D.
Purpose: Study of functional MRI, structural MR, and diffusion tensor imaging in autism, especially regards the neuro-correlates of behavior

National Alliance for Medical Image Computing (NAMIC) (NIH Grant U54 EB005149)
Role: Graduate Student Researcher
Funding Duration: January 2007 – August 2010
PI: Ron Kikinis, Ph.D., Arthur W. Toga, Ph.D.
Purpose: Development of diffusion imaging tools for the NAMIC/Slicer toolkit.

Center for Computational Biology (CCB) Grant (NIH Grant U54 RR021813)
Role: Graduate Student Researcher/Co-Author
Funding Duration: September 2004 – July 2009
PI: Arthur W. Toga, Ph.D.
Purpose: Develop, implement and deploy computational and mathematical tools for the analysis of biological problems in imaging.

Neuroimaging Training Program (NITP) Fellowship (NIH Grants R90 DA023419-01 and T90 DA023419-01)

Role: Fellowship recipient
Funding Duration: September 2006 – September 2008
PI: Mark Cohen, Ph.D.
Purpose: Competitive fellowship to train top graduate students as neuroscientists and clinical researchers who are experts in neuroimaging, and who can creatively and critically address pressing problems in health care and basic sciences.

Research Experience

Department of Applied Anatomy, Department of Pathology and Laboratory Medicine David Geffen School of Medicine at UCLA, Los Angeles, California (September 2011 – August 2012).

Development of computational methods for correlation of MRI and diffusion imaging with histological anatomy.

Laboratory of Neuroimaging Department of Neurology, David Geffen School of Medicine at UCLA, Los Angeles, California (September 2001 – September 2011).

Development of analysis and validation methods for diffusion tensor imaging and their clinical application (PI: Arthur W. Toga, Ph.D.).
Using optical imaging techniques to study the effects of basal physiologic conditions on stimulus evoked cerebral perfusion in the rat somatosensory cortex (PI: Arthur W. Toga, Ph.D.).

Department of Molecular Biology and Biochemistry Johns Hopkins School of Medicine, Baltimore, MD (September 1997 – May 2000).

Characterization of the Promoter Region of Interferon Regulatory Factor 7 (PI: Paula M. Pitha. Ph.D.).

Work Experience

Director of Research (February 2020 – current)

The Touchpoint Solution
Scottsdale, AZ
Hired by The Touchpoint Solution, a biotechnology company which has developed and sells Touchpoints™ worldwide, a wearable device for reducing stress and anxiety based on eye movement desensitization and reprocessing

(EMDR) psychotherapy. Responsibilities include the development, coordination, and productivity of research projects and grants involving Touchpoints™.

Freelance Medical Writer (January 2015 – current)

Upwork.com

Contract consultant work focusing on writing and editing medical research articles and grants and creating medical education content and CME content for medical students and physicians

Resident Physician, Department of General Surgery (July 2014 – October 2014)

Kaiser Permanente, Los Angeles
4867 W Sunset Blvd, Los Angeles, CA
Department of General Surgery
Responsibilities included surgical training and the care of surgical patients in both inpatient and outpatient settings. Withdrew from program early to focus my career on medical research.

Post-Doctoral Fellow (September 2011 – August 2012)

Department of Pathology and Laboratory Medicine, David Geffen School of Medicine at UCLA, Los Angeles, California.
Responsibilities included gross anatomy teaching duties for first year medical students and work on multiple clinical and basic science research projects.

Teaching Assistant for Graduate Course in Neuroanatomy (NS 203) (Winter Quarter 2007)

Interdepartmental Program (IDP) in Neuroscience at UCLA, Los Angeles, California; Instructor: Dr. Arne Scheibel, M.D.
Responsibilities included grading of student exams, attendance at all lectures, teaching during weekly laboratory sessions, weekly two-hour long student lectures on covered course material, and development and teaching of course lecture material.

Teacher's Assistant for Physiological Science m173 – Anatomy and Physiology of Sense Organs (Spring Quarter 2004, Spring Quarter 2006, Spring Quarter 2007)

Department of Physiological Science at UCLA, Los Angeles, California; Instructors: Dr. Alan Grinnell, Dr. Gordan Fain
Responsibilities included grading of student exams, attendance at all lectures, weekly hour-long student lectures on covered course material, and development and teaching of course lecture material.

Teacher's Assistant for Physiological Science 171 - Neuroethology (Fall Quarter 2004)

Department of Physiological Science at UCLA, Los Angeles, California
Responsibilities included grading of student homework and exams, attendance at all lectures, and class administrative work.

Teacher's Assistant for Physiological Science M101C – Systems Neuroscience (January 2003 – May 2003)

Department of Physiological Science at UCLA, Los Angeles, California.
Responsibilities included grading of student homework and exams, attendance at all lectures, and class administrative work.

Volunteer Experience

Medical Student Problem Based Learning (PBL) Group Tutor (December 2011– February 2012)

Responsibilities included leading weekly sessions where a small group of first or second-year medical students work through a clinical case.

Member of the Licensing Committee on Medical Education (LCME) Subcommittee on Medical Education (August 2011 – May 2012)

Responsibilities included attendance at all committee meetings and participation in the committee's task to compile a full report on current medical education policies, practices, and activities at the David Geffen School of Medicine at UCLA for the upcoming LCME site visit and accreditation.

Laboratory Instructor for 1st Year Medical School Neuroanatomy Lab Course (Spring Quarter 2003, Spring Quarter 2004, Spring Quarter 2005, Spring Quarter 2006)

David Geffen School of Medicine at UCLA, Los Angeles, California; Instructor: Carolyn Houser, Ph.D
Responsibilities included weekly teaching duties during all laboratory sessions.

Prosector for the Medical School Gross Anatomy Course (September 2006 – May 2007)

Department of Anatomy, David Geffen School of Medicine at UCLA, Los Angeles, California; Instructors: Shelly Metten Ph.D, Jonathan Wisco Ph.D, Dr. Jayc Seidelmeyer, Ph.D
Responsibilities included guided prosections of cadavers for next academic year's course

Organizing Committee for Annual UCLA Neuroscience / Neuroengineering Retreat (July – October 2006)

Responsibilities included scheduling speakers for and organizing all aspects of the annual departmental retreat.

Publications

Araujo, A., Park, D., Steed, K.S., Ajijola, O.A., Shivkumar, K., Mahajan, A., Fishbein, M., Hageman, N.S., Stark, M.E., and Wisco, J.J (2020). An Assessment of Stellate Ganglion Neuronal Remodeling in Association with Cardiovascular Disease. *Cell.* Under Review. ISCIENCE-D-20-00399. Available at SSRN: https://ssrn.com/abstract=3564981 or http://dx.doi.org/10.2139/ssrn.3564981

Pinto Leal-Junior, E.C., Casalechi, H.L., Monteiro Machado, C.S., Serin, A., Hageman N.S., Johnson, D.S. (2019). A Triple-Blind, Placebo-Controlled Randomized Trial of the Effect of Bilateral Alternating Somatosensory Stimulation on Reducing Stress-Related Cortisol and Anxiety During and After the Trier Social Stress Test. *Journal of Biotechnology and Biomedical Sciences, 2(1):* 22-30. doi: 10.14302/issn.2576-6694.jbbs-19-2784

Serin, A., Hageman, N.S., Kade, E. (2018). The Therapeutic Effect of Bilateral Alternating Stimulation Tactile Form Technology on the Stress Response. *Journal of Biotechnology and Biomedical Sciences, 1(2)*: 42-47. doi: 10.14302/issn.2576-6694.jbbs-18-1887

Nazaran, A., Wisco, J. J., Hageman, N., Schettler, S. P., Wong, A., Vinters, H. V., ... & Bangerter, N. K. (2016). Methodology for computing white matter nerve fiber orientation in human histological slices. *Journal of Neuroscience Methods*, *261*, 75-84.

Liu, R.M., Hageman, N.S., Yang, G., Cheng, N., Chan, K., Liu, E., Ortiz, J., Honarpisheh, H., Wong, A., Stark, M.E., Dong, H., Vinters, H., Toga, A.W., & Wisco, J. (2013). Anatomical Validation of Diffusion Tensor Imaging (DTI). *FASEB, 27(1),* lb1-1217.39.

Hageman, N.S. (2011). *Diffusion Tensor Imaging Tractography: Methodology, Validation and Clinical Applications* (Doctoral Thesis). Retrieved from ProQuest Dissertations and Theses database (UMI No. 3532423).

Clark, K.A., Nuechterlein, K.H., Asarnow, R.F., Hamilton, L.S., Philips, O.R., Hageman, N.S., Woods, R.P., Alger, J.R., Toga, A.W., & Narr, K.L. (2011). Mean diffusivity and fractional anisotropy as indicators of disease and genetic liability to schizophrenia. *Journal of Psychiatric Research, 45(7)*, 980-988.

Ortiz, J., Hageman, N., Salin, A., Salin, M., Dong, H. W., Stark, M. E., ... & Wisco, J. J. (2010). Histological validation of the diffusion tensor: feasibility in human brain tissue. *The FASEB Journal*, *24*(1 Supplement), 642-2.

Hageman, N.S., Thompson, P.M., Shattuck, D.W., Avedissian, C., Barysheva, M., McMahon, K.L., … & Toga, A.W. (2009). Genetic influences on white matter architecture in twins: A diffusion tensor tractography study. *NeuroImage*, *47*(1), S162.

Hageman, N.S., Leow, A., Shattuck, D.W., Zhan, L., Thompson, P.M., Zhu, S., & Toga, A.W. (2009). Segmenting crossing fiber geometries using fluid mechanics tensor

distribution function tractography. *IEEE Proceedings of the International Symposium on Biomedical Imaging (ISBI) 2009 Conference,* 1390.

Zhan, L., Leow, A.D., Zhu, S., Hageman, N.S., Chiang, M.C., Barysheva, M., Toga, A.W., & Thompson, P.M. (2009). What does Fractional Anisotropy (FA) really measure? *Medical Image Computing and Computer Assisted Intervention (MICCAI) 2009 Conference*, 845-852.

Leow, A. D., Zhan, L., Zhu, S., Hageman, N., Chiang, M. C., Barysheva, M., ... & Thompson, P. M. (2009). Novel Measure of Fiber Integrity based on Q-Ball Imaging and the Tensor Distribution Function avoids Problems with Fractional Anisotropy Measures. *Neuroimage*, *47*, S105.

Leow, A.D., Zhan, L., Zhu, S., Hageman, N.S., Chiang, M.C., Barysheva, M., Toga, A.W., McMahon, K.L., de Zubicaray, G.I., Wright, M.J., & Thompson, P.M. White Matter Integrity Measured by Fractional Anisotropy Correlates Poorly with Actual Individual Fiber Anisotropy. *IEEE Proceedings of the International Symposium on Biomedical Imaging (ISBI) 2009 Conference,* 622-625.

Prakash, N., Hageman, N.S., Hua, X., Toga, A.W., Perlman, S.L., & Salamon, N. (2009). Patterns of fractional anisotropy changes in white matter of cerebellar peduncles distinguish spinocerebellar ataxia-1 from multiple system atrophy and other ataxia syndromes**.** *Neuroimage, 47(2)*, T72-T81.

Hageman, N.S., Toga, A.W., Narr, K.L., & Shattuck, D.W. A Diffusion Tensor Imaging Tractography Algorithm Based on Navier-Stokes Fluid Mechanics. (2009). *IEEE Transactions on Medical Imaging, 28(3)*, 348-360.

Phillips, O.R., Nuechterlein, K.H., Clark, K.A., Hamilton, L.S., Asarnow, R.F., Hageman, N.S., Toga, A.W., & Narr, K.L. (2009). Fiber tractography reveals disruption of temporal lobe white matter tracts in schizophrenia**.** *Schizophrenia Research, 101(1)*, 30-38.

Narr, K.L., Hageman, N.S., Woods, R.P., Hamilton, L.S., Clark, K., Phillips, O., Shattuck, D.W., Asarnow, R.F., Toga, A.W., & Nuechterlein, K.H. (2009). Mean diffusivity: A biomarker for CSF-related disease and genetic liability effects in schizophrenia. *Psychiatric Research: Neuroimaging, 171(1)*, 20-32.

Hageman, N.S. (2008). Diffusion Tensor Imaging Tractography: Revealing Connectivity in the Living Brain. *Biomedical Computation Review.*

Hageman, N.S., Shattuck, D.W., Narr, K.L., & Toga, A.W. (2006). A Diffusion Tensor Imaging Tractography Method Based on Navier-Stokes Fluid Mechanics. *IEEE Proceedings of the International Symposium on Biomedical Imaging (ISBI) 2006 Conference.*

Sicotte, N.L., Salamon, G., Shattuck, D.W., Hageman, N.S., Rüb, U., Salamon, N., Drain, A.E., Demer, J.L., Engle, E.C., Alger, J.R., Baloh, R.W., Deller, T., & Jen, J.C. (2005). Diffusion Tensor MRI Shows Abnormal Brainstem Crossing Fibers Associated with ROBO3 Mutations. *Neurology, 67(3)*, 519-521.

Sheth, S., Nemoto, M., Guiou, M., Walker, M., Pouratian, N., Hageman, N.S., & Toga, A.W. (2004). Columnar specificity of microvascular oxygenation and volume responses: Implications for functional brain mapping. *J Neurosci., 24,* 634-641.

Lu, R., Au, W.C., Yeow, W.S., Hageman, N.S., & Pitha, P.M. (2000). Regulation of the Promoter Activity of Interferon Regulatory Factor-7 Gene: Activation by Interferon and Silencing by Hypermethylation. *J. Biol. Chem., 275*, 31805-31812.

Invited Talks

New Frontiers in Diffusion Tensor Imaging Tractography: Applications to Neurosurgery
Guest lecturer at Neurosurgery Grand Rounds,
January 25th, 2013; Harbor-UCLA Hospital, Torrance, CA.

Methodology and Clinical Applications of Diffusion Tensor Imaging
Invited Lecturer for UCLA Graduate Core Course, Principles of Neuroimaging
April 5th, 2010 & May 4th, 2009; David Geffen School of Medicine at UCLA, Los Angeles, CA

Diffusion Tensor Imaging: Methodology and Applications
Presenter for the UCLA-USC Symposium on Imaging Tools
November 23rd, 2009; Keck School of Medicine at USC, Los Angeles, CA.

Principles of Diffusion Tensor Imaging Tractography
Invited Lecturer for Neuroimaging Training Program (NITP) Summer Course
July 28th, 2009; David Geffen School of Medicine at UCLA, Los Angeles, CA

The Radiologic Imaging of Sense Organs
Invited Lecturer for the Undergraduate Course, Anatomy and Physiology of Sense Organs
May 12th, 2009; David Geffen School of Medicine at UCLA, Los Angeles, CA

Inheritance of White Matter Architecture and Intelligence in Twins
Annual UCLA Neuroscience / Neuroengineering Retreat
October 25, 2008; Calamigos Ranch Ventura, CA

Genetics of Brain Structure: Analysis of Diffusion Tensor Imaging in Twins

25th Anniversary MSTP Annual Research Symposium

October 17th, 2008; David Geffen School of Medicine at UCLA, Los Angeles, CA.

Optical Intrinsic Signals

Invited Lecturer for the UCLA Graduate Core Course, Principles of Neuroimaging

April 4th, 2007; David Geffen School of Medicine at UCLA, Los Angeles, CA

Neuroanatomy and Circuitry of the Basal Ganglia

Guest Lecturer for the UCLA Graduate Student Neuroanatomy Course Taught by Dr. Arnold Scheibel

February 28th, 2007; David Geffen School of Medicine at UCLA, Los Angeles, CA

A Diffusion Tensor Imaging Tractography Method Based on Navier-Stokes Fluid Mechanics

IEEE International Symposium on Biomedical Imaging: From Nano to Macro

April 8th, 2006; Crystal Gateway Marriott Arlington, VA

A Novel White Matter Segementation and Diffusion Tensor Imaging Tractography Method

Annual UCLA Neuroscience / Neuroengineering Retreat

October 29, 2005; Calamigos Ranch Ventura, CA

A Probabilistic Connection Based Diffusion Imaging Tractography Method Based on Navier-Stokes Fluid Mechanics

Brain Mapping Seminar Series

May 18, 2005; David Geffen School of Medicine at UCLA, Los Angeles, CA

Posters

Liu R, Hageman NS, Yang G, Cheng N, Chan K, Liu E, Ortiz JR, Honarpisheh H, Wong A, Stark ME, Dong H, Vinters HV, Toga AW, Wisco JJ. **Anatomical validation of diffusion tensor imaging.**

Presented at the Annual Meeting of the American Association of Anatomists at Experimental Biology 2013, Boston, MA, April 20-24, 2013.

Ortiz JR, Ajijola OA, Hageman N, Wisco JJ. **First in-human evidence of extra-cardiac neural remodeling after healed myocardial infarction**.

Presented at the 2012 Annual UCLA Medical Student Research Day, David Geffen School of Medicine at UCLA, Los Angeles, CA, 2012

Hageman NS, Wisco JJ, Toga AW. **A Comparison of Pre- Versus Post-Perfusion DTI Tractography in Cadaveric Brain Tissue.**

Presented at the 17th Annual Meeting of the Organization for Human Brain Mapping, 2011.

Ortiz J, Hageman NS, Salin A, Salin M, Dong HW, Stark ME, Vinters HV, Toga, AW, Wisco JJ. **Histological validation of the diffusion tensor: feasibility in human brain tissue.**

Presented at the Annual Meeting of the American Association of Anatomists at Experimental Biology 2010, Anaheim, CA, April 24th – 28th, 2010.

Hageman NS, Thompson PM, Shattuck DW, Avedissian C, Barysheva M, McMahon KL, de Zubicaray GL, Wright MJ, Toga AW. **Genetics of White Matter Architecture in Twins: A Diffusion Tensor Tractography Study.**

Presented at the Annual UCLA Department of Neurology Science Day, 2009.

Ortiz J, Hageman NS, Dong HW, Salin A, Salin M, Stark ME, Vinters HV, Toga, AW, Wisco JJ. **Reducing Uncertainty in Estimates of Nerve Fiber Orientation Captured by Diffusion Tensor MR Imaging by Comparing Mapped White Matter Fibers in Paired Histological Sections.**

Presented at the Annual Short Term Training Program Summer Poster Fair, 2009.

Hageman NS, Thompson PM, Shattuck DW, Avedissian C, Barysheva M, McMahon KL, de Zubicaray GL, Wright MJ, Toga AW. **Genetic Influences on White Matter Architecture in Twins: A Diffusion Tensor Tractography Study.**

Presented at the 15th Annual Meeting of the Organization for Human Brain Mapping, 2009.

Narr KL, Hageman NS, Hamilton LS, Alger JR, Woods RP, Phillips O, Asarnow RF, Shattuck DW, Toga AW, Nuechterlein KH. **Mean diffusivity: A biomarker for CSF-related disease and genetic liability effects in schizophrenia.**

Presented at 2008 UCLA Neurology Faculty Research Symposium, Los Angeles, CA January 2008.

Prakash N, Hageman NS, Hua X, Toga AW, Perlman S, Salamon N. **Patterns of fractional anisotropy changes in white matter of cerebellar peduncles sensitive for distinguishing cerebellar diseases.**

Presented at 14th Annual Meeting of the Organization for Human Brain Mapping, Melbourne, Australia, June 2008.

Hageman NS, Prakash N, Salamon N, Perlman S, Toga AW. **Characterizing cerebellar degeneration patterns in ataxia patients using diffusion tensor imaging.**

Presented at the 36th Annual Meeting for the Society for Neuroscience, Atlanta, Georgia, October 13th – 17th, 2006.

Hageman NS, Salamon N, Perlman S, Toga AW, Prakash N. **Characterizing cerebellar degeneration patterns in ataxia patients using diffusion tensor imaging.**

Presented at the 11th Annual Research Conference on Aging, Los Angeles, CA, June 20th, 2006.

Hageman NS, Sheth S, Guiou M, Nemoto M, Walker M, Toga AW. **Basal Conditions Affect Cerebral Perfusion in the Rat Somatosensory Cortex.**

Presented at the 9th Annual Meeting of the Organization for Human Brain Mapping, New York, NY, June 2003.

Sheth S, Hageman N, Guiou M, Walker M, Nemoto M, Pouratian N, Toga AW. **Advantages of Functional Brain Mapping Using Cerebral Blood Volume Contrast.**

Presented at the 9th Annual Meeting of the Organization for Human Brain Mapping, New York, NY, June 2003.

Sheth S, Guiou M, Nemoto M, Hageman N, Walker M, Toga AW. **Coupling Between the Cerebral Blood Volume and Cerebral Blood Flow in Rat Somatosensory Cortex.**

Presented at the 9th Annual Meeting of the Organization for Human Brain Mapping, New York, NY, June 2003.

Sheth S, Hageman N, Guiou M, Walker M, Nemoto M, Pouratian N, Toga AW. **Advantages of Functional Brain Mapping Using Cerebral Blood Volume Contrast.**

Presented at the XXIst International Symposium on Cerebral Blood Flow, Metabolism, and Function, Calgary, Alberta, July 2003.

Hageman N, Sheth S, Guiou M, Nemoto M, Walker M, Toga AW. **Coupling Between the Cerebral Blood Volume and Cerebral Blood Flow in the Rat Somatosensory Cortex.**

Presented at the XXIst International Symposium on Cerebral Blood Flow, Metabolism, and Function, Calgary, Alberta, July 2003.

Nemoto M, Sheth S, Guiou M, Chen JWY, Pouratian N, Hageman N, Toga AW. **A Linear Relationship Between Spiking Activity and Hemodynamic Responses in Brief Stimulation Revealed with Simultaneous Recordings of Local Field Potentials and Optical Intrinsic Signals.**

Presented at the XXIst International Symposium on Cerebral Blood Flow, Metabolism, and Function, Calgary, Alberta, July 2003.

Professional Organizations

American Association for the Advancement of Science (AAAS)

Student Member

Institute for Electrical and Electronics Engineers (IEEE)
Student Member

American Medical Student Association (AMSA)
Student Member

Society for Neuroscience (SFN)
Student Member

Organization for Human Brain Mapping (OHBM)
Student Member