

Arno Klein

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917-512-5627

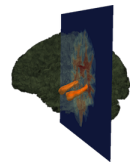
Employment



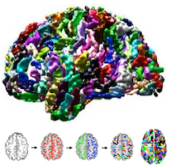
2007 - Assistant Professor of Clinical Neurobiology
Division of Molecular Imaging and Neuropathology
New York State Psychiatric Institute
Columbia University, NY
Research in human brain image processing, registration, and labeling



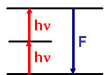
2004 - 2007 Information Synthesis Theorist and Program Analyst
Parsons Institute for Information Mapping
The New School, NY
Complex data visualization and visualization ontologies



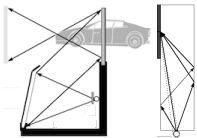
2004 - 2005 Researcher in brain imaging
Columbia University, NY
Detection of biomarkers of disease in brain MRI data



1998 - 2004 Weill Medical College of Cornell University, NY
Functional MRI Laboratory, Memorial Sloan-Kettering Cancer Center
Functional MRI Research Center, Columbia University
Ph.D. in Neuroscience, May, 2004
Thesis: Automated brain labeling with Mindboggle
Invented Mindboggle software to automate anatomical labeling of human brain data



1996 - 1998 California Institute of Technology
Computation and Neural Systems Program
Brain tissue optics research (with 2-photon uncaging) and biophysical computer modeling



1994 - 1996 Massachusetts Institute of Technology
Spatial Imaging Group, MIT Media Laboratory
M.S. in Media Arts and Sciences, September 1996
Thesis: Dispersion Compensation for Reflection Holography
Dispersion correction in holographic view stations and edge-lit holograms

Undergraduate Education

1991 - 1993 University of Michigan (Ann Arbor)
B.S. in Biopsychology, Perception and Cognition Studies, May 1993
Research assistant in the Kellogg Eye Institute
Independent computer-generated holographic stereogram research

1990 - 1991 Waseda University (Tokyo, Japan)
Japanese studies, International Division
Independent autostereoscopic holography research, Tama Art College

1988 - 1990 University of Southern California (Los Angeles)
Resident Honors Program scholar
Research assistant in Hedco Neurosciences
Independent display holography projects

Teaching

- 2007 - 2011 Invited lectures at Google, Dorkbot, Yale, UCLA, Stanford, Rutgers, etc.
- 2008 - 2010 Lecturer and guest lecturer for brain imaging courses, Columbia University
- 2008 - 2009 Columbia Co-lecturer for brain imaging course, Columbia
- 2005 - 2007 MFA thesis evaluator and guest lecturer for classes in typography and design
The New School, NY
- 2005 - 2007 Lecturer on data visualization and visualization ontologies to academic and government audiences, including the:
- *National Academy of Sciences*
 - *Office of the Director of National Intelligence*
 - *National Geospatial-Intelligence Agency*
 - *Port Authority of New York and New Jersey*
 - *Under Secretary of Defense at the Pentagon*
 - *ESRI and GEOINT conferences*
- 1994 - 1996 Teaching assistant (holography laboratory instructor), Media Laboratory, MA
- 1993 Intermediate Algebra instructor, Washtenaw Community College, Ann Arbor, MI
- 1990 - 1991 English school instructor, Tokyo, Japan
- 1990 Graduate school mentor for holography projects, USC, CA

Committees

- 2009 - Reviewer for neuroscience-related journals including:
NeuroImage, Human Brain Mapping, Neuroinformatics, IEEE Trans. on Medical Imaging, IEEE Trans. on Biomedical Engineering, Brain Structure and Function, International Journal of Biomedical Imaging, Psychiatry Research, Psychiatry Research: Neuroimaging
- 2009 - Member of the International Neuroinformatics Coordinating Facility's **Neuroimaging Task Force**
- 2007 Media Curricular Subchair under the Provost's office, The New School, NY
- 2006 Designed curriculum for an M.S. program in Information Mapping and Management, Office of the President of The New School, NY
- 2004 Review panel member, National Science Foundation

Funding

- 2010 - 2014 Co-Investigator
NIH U01 grant MH074813
Biological Predictors of Response to Antidepressants
- 2009 - 2012 Principal Investigator
NIH R01 grant MH084029
Mindboggling Shape Analysis and Identification
- 2006 Co-Director
Mellon Foundation grant
Photodocumentation of the Ellora Cave Temples in India
- 1993 Principal Investigator
Independent research grant, University of Michigan, Ann Arbor, MI
Holographic research

Projects



Mindboggle

mindboggle.info

Mindboggle is Python software to automate shape analysis and labeling of human brain anatomy (in MR image data). The software is part of a 3-year NIMH-funded R01 awarded in July, 2009.



BrainCOLOR

braincolor.org

I am involved in three BrainCOLOR-related projects:

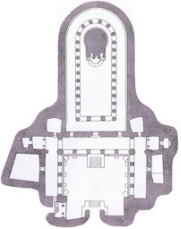
- (1) **labels** & labeling protocols for labeling macroscopic brain anatomy in MRI data
- (2) **colors** optimized for labeling/viewing groups of adjacent regions in 2-D or 3-D
- (3) **brains** displayed with our ROYG Brain Image Viewer



Ellora Daily Photo

elloradaily.info

I take a photograph of my daughter's face every day and use facial features to coregister the images to create a time-lapse animation of her entire life. I am working on crowdsourcing the feature extraction, and will experiment with nonlinear registrations (warping) of the resulting richly marked images. This project has been showcased in articles in the L.A. Times and Slate Magazine and has aired on Japan's NHK and Germany's DW-TV.



Ellora Cave Temples

elloracaves.org

My wife and I are collaborating with Professor Walter Spink of the University of Michigan to create the first comprehensive documentation of the Ellora cave temples of India. I took about 7,000 digital photographs of the 35 Buddhist, Hindu, and Jain cave temples and am constructing an online "walk through" user interface to view the images with respect to the temple ground plans. This work was funded in part by a grant from the Mellon Foundation, and ArtStor **announced** it in December, 2008.



Information Visualization

infovis.info

I created this searchable database of over 1,000 information graphics to develop a taxonomic classification system to organize and interrelate any graphical information (paper in preparation).



Quotes over Time

qovert.info

Quotes over Time tracked the top-quoted people from Reuters Alertnet News, and presents their quotes on a timeline.



Personal websites

ToadsOnTies.com:

my mother's upcoming design business

KAKlein.com:

my mother's art portfolio

ArnoldKleinGallery.com:

my parents' gallery of fine art

Pupating.org:

my brother's art portfolio / cultural entomology website

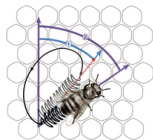
KorinthianViolins.com:

my sister's violin shop

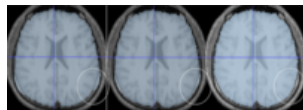
Publications



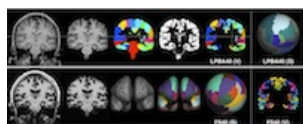
Learning from open source software projects to improve scientific review
Ghosh, SS, **Klein, A**, Avants, B, Millman, J. 2011.
Frontiers in Computational Neuroscience. Under review.



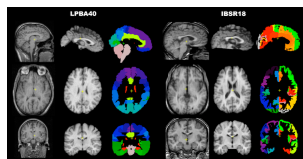
Sleep Deprivation impairs precision of waggle dance signaling in honey bees
Klein, BA, **Klein, A**, Wray, MK, Mueller, UG, Seeley, TD. 2010.
Proceedings of the National Academy of Sciences.
PNAS published ahead of print December 13, 2010.
News coverage: [Nature](#), [New Scientist](#), [Wired](#),...



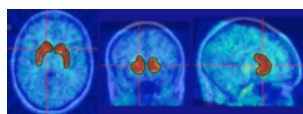
A reproducible evaluation of ANTs similarity metric performance in brain image registration
Avants, BB, Tustison, NJ, Song, G, Cook, PA, **Klein, A**, Gee, JC. 2010.
NeuroImage. 54(3): 2033-2044. doi:10.1016/j.neuroimage.2010.09.025
PMID: 20851191; PMCID: PMC3065962.



Evaluation of volume-based and surface-based brain image registration methods
Klein, A, Ghosh, SS, Avants, B, Yeo, BTT, Fischl, B, Ardekani, B, Gee, JC, Mann, JJ, Parsey, RV. 2010.
NeuroImage. 51: 214-220. doi:10.1016/j.neuroimage.2010.01.091
PMID: 20123029; PMCID: PMC2862732. [[PubMed Central](#)] [[supplementary website](#)]



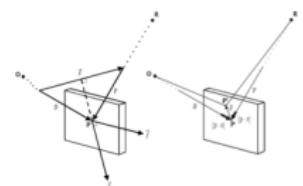
Evaluation of 14 nonlinear deformation algorithms applied to human brain MRI registration
Klein, A, Andersson, J, Ardekani, BA, Ashburner, J, Avants, B, Chiang, M-C, Christensen, GE, Collins, DL, Gee, J, Hellier, P, Song, JH, Jenkinson, M, Lepage, C, Rueckert, D, Thompson, P, Vercauteren, T, Woods, RP, Mann, JJ, Parsey, RV. 2009.
NeuroImage. 46(3): 786-802. doi:10.1016/j.neuroimage.2008.12.037
PMID: 19195496; PMCID: PMC2747506. [[PubMed Central](#)] [[supplementary website](#)]



A new method for assessing PET-MRI coregistration
DeLorenzo, C, **Klein, A**, Mikhno, A, Gray, N, Zanderigo, F, Mann, JJ, Parsey, RV. 2009.
Proc. SPIE - Medical Imaging. 7259, 72592W. doi:10.1117/12.812170



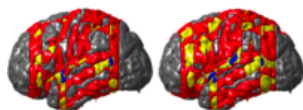
Caste-dependent sleep of worker honey bees
Klein, BA, Olzowy, KM, **Klein, A**, Saunders, KM, Seeley, TD. 2008.
Journal of Experimental Biology. 211: 3028-3040.



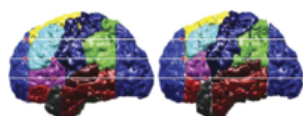
Relating vector ray-tracing equations for holograms of arbitrary shape and thickness
Klein, A. 2008.
Journal of the Optical Society of America A. 25(4): 979-983.



"Information visualization" entry in: Erlhoff Michael, Marshall Tim, eds.
Klein, A, Bevington, W. 2008.
Design Dictionary: Perspectives on Design Terminology. Basel, Boston, Berlin: Birkhauser Verlag.

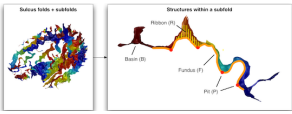


Mindboggle: Automated brain labeling with multiple atlases
Klein, A, Menth, B, Ghosh, S, Tourville, J, Hirsch, J. 2005.
BMC Medical Imaging. 5:7.
PMID: 16202176; PMCID: PMC1283974. [[PubMed Central](#)]

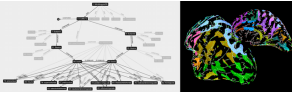


Mindboggle: A scatterbrained approach to automate brain labeling
Klein, A, Hirsch, J. 2005.
NeuroImage. 24(2): 261-280.
PMID: 15627570

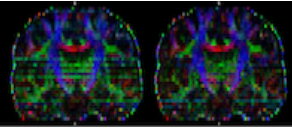
Conference presentations



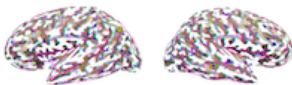
Mindboggle: an informatics framework for open research in quantifying the shape of the human brain
Klein, A. 2011.
BioImage Informatics II (talk at Janelia Farm).



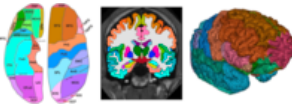
A graph-based database of hierarchical brain features
Lee, N and **Klein, A.** 2011.
Neuroinformatics 2011.



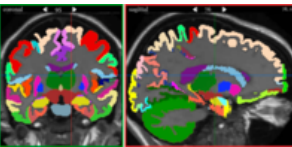
Automatic detection of corrupted volumes in DTI data
Peruzzo, D, Bertoldo, A, Parsey, R, **Klein, A.** 2011.
28th Annual Meeting for the European Society for Magnetic Resonance in Medicine and Biology.



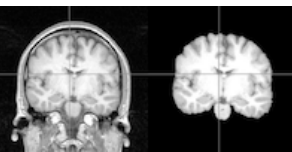
Automated extraction of nested sulcal features from human brain MRI data
Bao, F, Lee, N, Hame, Y, Im, K, Riviere, D, Li, G, **Klein, A.** 2011.
17th Annual Meeting for the Organization of Human Brain Mapping.



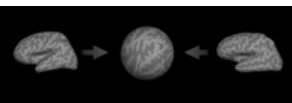
An interactive tool for constructing optimal brain colormaps
Klein, A, Worth, A, Tourville, J, Landman, B, Dal Canton, T, Ghosh, SS, Shattuck, D. 2010.
40th Annual Meeting for the Society for Neuroscience.
Website: www.braincolor.org/colors/



Open labels: online feedback for a public resource of manually labeled brain images
Klein, A, Dal Canton, T, Ghosh, SS, Landman, B, Lee, J., Worth, A. 2010.
16th Annual Meeting for the Organization of Human Brain Mapping.
Website: www.braincolor.org/roygbiv/



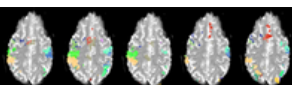
Evaluation of open-access, automated brain extraction methods on multi-site multi-disorder data
Avants, B, **Klein, A,** Tustison, N, Woo, J, Gee, JC. 2010.
16th Annual Meeting for the Organization of Human Brain Mapping.



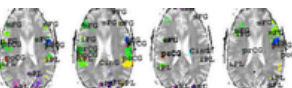
An evaluation of volume- and surface-based nonlinear registration of human brain MRI data
Klein, A, Ghosh, SS, Avants, B, Fischl, B, Yeo, T, Mann, JJ, Parsey, RV. 2009.
15th Annual Meeting for the Organization of Human Brain Mapping.



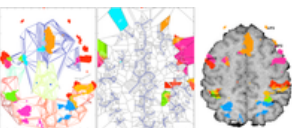
Activity patterns in the brain: breaking up the problem into pieces
Klein, A. 2004.
International Conference on Complex Systems (ICCS2004 talk).



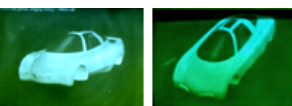
Mindboggle: new developments in automated brain labeling
Klein, A, Hirsch, J. 2003.
9th Annual Meeting for the Organization of Human Brain Mapping.



Fully-automated nonlinear labeling of human brain activity
Klein, A, Hirsch, J. 2002.
8th Annual Meeting for the Organization of Human Brain Mapping.



Automatic labeling of brain anatomy and fMRI brain activity
Klein, A, Hirsch, J. 2001.
7th Annual Meeting for the Organization of Human Brain Mapping.



Optics for full-parallax holographic stereograms
Klug, MA, **Klein, A,** Plesniak, W, Kropp, A, Chen, B. 1997.
Proc. SPIE. 3011 (78) "Practical Holography XI" [doi:10.1117/12.271340]