CURRICULUM VITAE

Name: Nan-kuei Chen, Ph.D.

Email: nkchen@email.arizona.edu

Phone number: +1-520-626-0060

Primary appointment: Associate Professor of Biomedical Engineering, University of Arizona

Education	Institution	Year	Degree
College	National Cheng Kung University	1988-1992	B.S. (Physics)
Graduate or Professional School	Northwestern University, USA	1996-1998	M.S. (Biomedical Engineering)
	Northwestern University, USA	1998-2001	Ph.D. (Biomedical Engineering)

Professional training and academic career:

Institution	Position/Title	Dates
Harvard Medical School	Research Fellow of Radiology	2001-2003
Harvard Medical School	Instructor of Radiology	2003-2005
Harvard Medical School	Assistant Professor of Radiology	2005-2007
Duke University	Assistant Professor of Radiology	2007-2012
Duke University	Associate Professor of Radiology	2012-2016
Duke University	Associate Professor of Biomedical Engineering	2015-2016
Duke University	Adjunct Associate Professor of Radiology	2016-present
University of Arizona	Associate Professor of Biomedical Engineering	2016-present
University of Arizona	Associate Professor of Medical Imaging	2016-present

Patents and publications:

Patents:

1. <u>Chen NK</u>, Avram AV, Song AW, Truong TK. Multi-dimensional iterative phase-cycled reconstruction for MRI images. International patent WO2012047771& USA patent US20130182932 (13/824,704) & China patent CN103124517 & Europe patent EP2624751. Filing date 2011-10-03 Publication date 2013-08-14.

2. <u>Chen NK</u>, Truong TK, Song AW. MRI data acquisition, reconstruction and correction methods for diffusion weighted imaging (DWI) and diffusion tensor imaging (DTI) and related systems. International patent WO2012088031 & US patent US20130249555 (13/992,537). Filing date 2011-12-20 Publication date 2013-09-26.

3. <u>Chen NK</u>, MRI data acquisition, High-throughput and motion-insensitive MRI accelerated with multi-echo echo-planar acquisition and related systems. International patent WO2012112409 & US patent US20130307542 (13/982,609). Filing date 2012-02-13 Publication date 2013-11-21.

4. <u>Chen NK</u>, Song AW. Navigator-less segmented diffusion weighted imaging enabled by multiplexed sensitivity-encoded imaging with inherent phase correction. International patent WO2014004870 & US patent US20140002078 (13/928,757). Filing date 2013-06-27 Publication date 2014-01-02.

5. <u>Chen NK</u>, Song AW, Chu ML. Multi-Dimensional Motion-Immune MRI Enabled by K-T-Bootstrapping Analysis of Accelerated Scans. PCT International Patent Application: PCT/US2014/031711 (March 25 2014).

6. <u>Chen NK</u>. Spectral-tagging technique for improving MRI multi-band and multiplexed imaging. Invention Disclosure with University of Arizona: UA17-134 (January 2017).

Refereed journals: (Refereed journals are scientific publications that have active editorial boards and a system of critical review of all submissions for publication)

1. <u>Chen NK</u>, Wyrwicz AM. Correction for EPI distortions using multi-echo gradient-echo imaging. Magn Reson Med. 1999;41(6):1206-13.

2. <u>Chen NK</u>, Wyrwicz AM. Removal of intravoxel dephasing artifact in gradient-echo images using a field-map based RF refocusing technique. Magn Reson Med. 1999;42(4):807-12.

3. Wyrwicz AM, <u>Chen NK</u>, Li L, Weiss C, Disterhoft JF. fMRI of visual system activation in the conscious rabbit. Magn Reson Med. 2000;44(3):474-8.

4. <u>Chen NK</u>, Wyrwicz AM. Optimized distortion correction technique for echo planar imaging. Magn Reson Med. 2001;45(3):525-8.

5. <u>Chen NK</u>, Dickey CC, Yoo SS, Guttmann CR, Panych LP. Selection of voxel size and slice orientation for fMRI in the presence of susceptibility field gradients: application to imaging of the amygdala. Neuroimage. 2003;19(3):817-25.

6. <u>Chen NK</u>, Egorova S, Guttmann CR, Panych LP. Functional MRI with variable echo time acquisition. Neuroimage. 2003;20(4):2062-70.

7. Miller MJ, <u>Chen NK</u>, Li L, Tom B, Weiss C, Disterhoft JF, Wyrwicz AM. fMRI of the conscious rabbit during unilateral classical eyeblink conditioning reveals bilateral cerebellar activation. J Neurosci. 2003; 23(37): 11753-8.

8. <u>Chen NK</u>, Wyrwicz AM. Removal of EPI Nyquist ghost artifacts with two-dimensional phase

correction. Magn Reson Med. 2004; 51: 1247-1253.

9. Chen NK*, Oshio K, Panych LP, Rybicki FJ, Mulkern RV. Spatially-selective T2 and T2* measurement with Line-Scan Echo-Planar Spectroscopic Imaging. J Magn Reson. 2004;171:90-96. (*corresponding author)

10. Yoo SS, Fairneny T, Chen NK, Panych LP, Park HW, Lee SY, Jolesz FA. Brain-computer interface using fMRI: spatial navigation by thoughts. Neuroreport. 2004;19(15):1591-1595.

11. Mulkern RV, Chen NK, Oshio K, Panych LP, Rybicki FJ, Gambarota G. Fast spectroscopic imaging strategies for potential applications in fMRI. Magn Reson Imag. 2004;22(10):1395-1405.

12. Lin FH, Huang TY, Chen NK, Wang FN, Stufflebeam SM, Belliveau JW, Wald LL, Kwong KK. Functional MRI using regularized parallel imaging acquisition. Magnetic Resonance in Medicine. 2005;54(2):343-353.

13. Wang FN, Huang TY, Lin FH, Chuang TC, Chen NK, Chung HW, Chen CY, Kwong KK. PROPELLER EPI: an MRI technique suitable for diffusion tensor imaging at high field strength with reduced geometric distortions. Magnetic Resonance in Medicine. 2005;54(5):1232-1240.

14. Liu T, Young G, Huang L, Chen NK, Wong ST. 76-Space analysis of grey matter diffusivity: Methods and applications. Neuroimage. 2006; 31(1): 51-65.

15. Chen NK*, Oshio K, Panych LP. Application of k-space energy spectrum analysis to EPI distortion correction. Neuroimage. 2006; 31(2): 609-22. (*corresponding author)

16. Milles J, Zhu YM, Chen NK, Panych LP, Gimenez G, Guttmann CR. Computation of transmitted and received B1 fields in magnetic resonance imaging. IEEE Trans Biomed Eng. 2006;53(5):885-95.

17. Lin YR, Young GS, Chen NK, Dillon, WP, Wong S. CJD involvement of Rolandic Cortex: A Quantitative ADC Evaluation. American Journal of Neuroradiology.2006 Sep;27(8):1755-9.

18. Brass S., Chen NK, Mulkern RV, Bakshi R, Magnetic resonance imaging of iron deposition in neurologic disorders. Topics in Magnetic Resonance Imaging. 2006 Feb;17(1):31-40.

19. Yoo SS, O'Leary HM, Fairneny T, Chen NK, Panych LP, Park H, Jolesz FA. Increasing cortical activity in auditory areas through neurofeedback functional magnetic resonance imaging. Neuroreport. 2006 Aug 21;17(12):1273-8.

20. Yoo SS, O'Leary HM, Lee JH, Chen NK, Panych LP, Jolesz FA. Reproducibility of trial-based functional MRI on motor imagery. Int J Neurosci. 2007 Feb;117(2):215-27.

21. McDannold N, Barnes AS, Rybicki FJ, Oshio K, Chen NK, Hynynen K, Mulkern RV. Temperature Mapping Considerations in the Breast with Line Scan Echo Planar Spectroscopic Imaging. Magnetic Resonance in Medicine. 2007; 58: 1117-1123.

22. Chen NK*, Oshio K, Panych LP. Improved image reconstruction for partial Fourier gradient-echo EPI. Magnetic Resonance in Medicine. 2008; 59(4): 916-24. (*corresponding author)

23. Young GS, Feng F, Shen H, Chen NK*. Susceptibility enhanced 3 Tesla T1-weighted SPGR of the midbrain nuclei for guidance of deep brain stimulation implantation. Neurosurgery. 2009; 65(4): 809 815. (*corresponding author)

24. Lin JM, Tsai SY, Liu HS, Chung HW, Mulkern RV, Cheng CM, Yeh TC, Chen NK. Quantification of non-water suppressed MR spectra with correction for motion-induced signal reduction. Magnetic Resonance in Medicine. 2009; 62(6):1394-403.

25. <u>Chen NK</u>, Chou YH, Song AW, Madden DJ. Measurement of spontaneous signal fluctuations in fMRI: adult age differences in intrinsic functional connectivity. Brain Struct Funct. 2009; 213(6): 1863-2653.

26. Truong TK, <u>Chen NK</u>, Song AW. Application of k-space energy spectrum analysis for inherent and dynamic B0 mapping and deblurring in spiral imaging. Magnetic Resonance in Medicine. 2010; 64(4): 1121-7.

27. <u>Chen NK*</u>, Avram AV, Song AW. Two-dimensional phase cycled reconstruction for inherent correction of EPI Nyquist artifacts. Magn Reson Med. 2011 Oct;66(4):1057-66. doi: 10.1002/mrm. 22896. (*corresponding author)

28. Truong TK, <u>Chen NK</u>, Song AW. Dynamic Correction of Artifacts due to Susceptibility Effects and Time-Varying Eddy Currents in Diffusion Tensor Imaging. Neuroimage. 2011; 15;57(4):1343-7.

29. Mei CS, Mulkern RV, Oshio K, <u>Chen NK</u>, Madore B, Panych LP, Hynynen K, McDannold N. Ultrafast 1D approach for MR thermometry using phase or frequency mapping. Magnetic Resonance Materials in Physics, Biology and Medicine. 2012, Volume 25, Issue 1, pp 5-14.

30. Yang YH, Huang TY, Wang FN, Chuang TC, <u>Chen NK</u>. Accelerating EPI distortion correction using modern GPU- based parallel computation. Journal of Neuroimaging 2011 Sep 13 doi: 10.1111/j. 1552-6569.2011.00654.x. [Epub ahead of print].

31. Madden DJ, Bennett IJ, Burzynska A, Potter GG, <u>Chen NK</u>, Song AW. Diffusion tensor imaging of cerebral white matter integrity in cognitive aging. Biochim Biophys Acta. 2012 Mar;1822(3):386-400.

32. Chou YH, Panych LP, Dickey C, Petrella J, <u>Chen NK*</u>. Investigation of long-term reproducibility of intrinsic connectivity network mapping: A resting-state fMRI study. American Journal of Neuroradiology (AJNR). 2012 May;33(5):833-8. (* corresponding author)

33. Panych LP, Roebuck JR, <u>Chen NK</u>, Tang Y, Madore B, Tempany CM, Mulkern RV. Investigation of the PSF-Choice method for reduced lipid contamination in prostate MRSI. Magnetic Resonance in Medicine. 2012 Nov;68(5):1376-82.

34. Rosas HD, Chen YI, Doros G, Salat DH, <u>Chen NK</u>, Kwong KK, Fox J, Hersch S. Alterations in brain transition metals in Huntington's disease: An evolving and intricate story. Archives of Neurology. 2012 Jul;69(7):887-93.

35. Truong TK*, <u>Chen NK*</u>, Song AW. Inherent Correction of Motion-Induced Phase Errors in Multi-Shot Spiral Diffusion-Weighted Imaging. Magnetic Resonance in Medicine. 2012 Oct;68(4):1255-61 (*corresponding authors)

36. Froeliger BE, Garland E, Kozink RV, Modlin L, <u>Chen NK</u>, McClernon FJ, Sobin P. Meditation-State Functional Connectivity (msFC): Strengthening of the Default Mode Network and Beyond. Evidence based complementary and alternative medicine. 2012:680407. doi: 10.1155/2012/680407. Epub 2012 Feb 12.

37. <u>Chen NK*</u>, Guidon A, Chang HC, Song AW. A robust multi-shot scan strategy for high-resolution diffusion weighted MRI enabled by multiplexed sensitivity-encoding (MUSE). Neuroimage. 2013 Jan 28;72:41-47. (*corresponding author)

38. Chou YH, <u>Chen NK</u>, Madden DJ. Functional Brain Connectivity and Cognition: Effects of Adult Age and Task Demands. Neurobiology of Aging. 2013 34:1925-1934.

39. Song XM, <u>Chen NK</u>, Gaur P. A Kernel Machine-based fMRI Physiological Noise Removal Method. Magnetic Resonance Imaging. 2014 32:150-162.

40. Song XM, <u>Chen NK</u>. A SVM-based Quantitative fMRI Method For Resting State Functional Network Detection. Magnetic Resonance Imaging. 2014 32:819-831.

41. Song XM, Chou YH, Panych, LP, <u>Chen NK</u>. A Study of Long-term Functional MRI Reproducibility In A Motor Task. International Journal of Imaging Systems and Technology. 2014 24:339-349.

42. Chang HC, Guhaniyogi S, <u>Chen NK</u>*. Interleaved diffusion-weighted EPI improved by adaptive partial-Fourier and multi-band multiplexed sensitivity-encoding reconstruction. Magnetic Resonance in Medicine. 2015; 73(5):1872-84. (*corresponding authors)

43 Sundman MH, Hall EE, and <u>Chen NK</u>. Examining the Relationship between Head Trauma and Neurodegenerative Disease: A Review of Epidemiology, Pathology and Neuroimaging Techniques. J Alzheimers Dis Parkinsonism 2014 Jan 31;4. pii: 137.

44 Madden DJ, Parks E, Davis S, Diaz M, Potter G, Chou YH, <u>Chen NK</u>, and Roberto Cabeza R. Age Mediation of Frontoparietal Activation during Visual Feature Search. Neuroimage. 2014 Nov 15;102 Pt 2:262-74.

45. Song AW, Chang HC, Petty C, Guidon A, <u>Chen NK</u>. Improved delineation of short cortical association fibers and gray/white matter boundary using whole-brain 3D DTI at sub-millimeter spatial resolution. Brain Connectivity 2014 Nov;4(9):636-40.

46. Whitson HE, Chou YH, Potter G, Diaz M, <u>Chen NK</u>, Lad E, Johnson M, Cousins S, Zhuang J, Madden D. Phonemic Fluency and Brain Connectivity in Age-Related Macular Degeneration: A Pilot Study. Brain Connectivity 2015; 5(2):126-35.

47. Chang HC, Gaur P, Chou YH, Chu ML, <u>Chen NK</u>*. Interleaved EPI based fMRI improved by multiplexed sensitivity encoding (MUSE) and simultaneous multi-band imaging. PLOS ONE 2014: 2014 Dec 30;9(12):e116378. (*corresponding author)

48. Truong TK, Song AW, <u>Chen NK</u>*. Correction for eddy current-induced echo-shifting effect in partial-Fourier diffusion tensor imaging. BioMed Research International 2015; 2015:185026. (*corresponding author)

49. Chu ML, Chang HC, Chung HW, Bashir MR, <u>Chen NK</u>*. POCS-based reconstruction of multiplexed sensitivity encoded MRI (POCSMUSE): a general algorithm for reducing motion-related artifacts. Magnetic Resonance in Medicine 2015; 74(5):1336-48. (*corresponding author).

50. Liu Y, Yin FF, <u>Chen NK</u>, Chu ML, Cai J. Four Dimensional Magnetic Resonance Imaging (4D-MRI) with Retrospective K-space Sorting: a Feasibility Study. Medical Physics 2015; 42(2):534-41.

51. Carpenter KLH, Angold A, <u>Chen NK</u>, Copeland WE, Gaur P, Pelphrey K, Song AW, Egger HL. Preschool anxiety disorders predict different patterns of amygdala-prefrontal connectivity at school-age. PLOS ONE 2015 Jan 27;10(1):e0116854.

52. Chou YH, Hickey PT, Sundman M, Song AW, <u>Chen NK</u>*. Effects of Repetitive Transcranial Magnetic Stimulation on Motor Symptoms in Parkinson's Disease: A Systematic Review and Meta-Analysis. JAMA Neurology 2015; 72(4):432-40. (*corresponding author)

53. Doherty JR, Dahl JJ, Kranz PG, El Husseini N, Chang HC, <u>Chen NK</u>, Allen JD, Ham KL, Trahey GE. Comparison of Acoustic Radiation Force Impulse Imaging Derived Carotid Plaque Stiffness With Spatially Registered MRI Determined Composition. IEEE transactions on medical imaging. 2015; 34(11):2354-65.

54. Song X, Panych LP, <u>Chen NK</u>. Data-driven and Predefined ROI-based Quantification of Long-term Resting-state fMRI Reproducibility. Brain connectivity. 2015 Nov 18. [Epub ahead of print].

55. Weingarten CP, Sundman MH, Hickey P, Chen NK. Neuroimaging of Parkinson's disease: Expanding views. Neuroscience and biobehavioral reviews. 2015; 59:16-52.

56. Chang HC, Sundman M, Petit L, Guhaniyogi S, Chu ML, Petty C, Song AW, Chen NK*. Human brain diffusion tensor imaging at submillimeter isotropic resolution on a 3Tesla clinical MRI scanner. NeuroImage. 2015; 118:667-75. (*corresponding author)

57. Wu ML, Chang HC, Chao TC, Chen NK. Efficient imaging of midbrain nuclei using inverse double-echo steady-state acquisition. Medical physics. 2015; 42(7):4367-74.

58. Chou YH, You H*, Wang H*, Zhao YP, Hou B, Chen NK*, Feng F. Effect of Repetitive Transcranial Magnetic Stimulation on fMRI Resting-State Connectivity in Multiple System Atrophy. Brain connectivity. 2015; 5(7):451-9. (*corresponding author)

59. Song X, Panych LP, Chen NK. Spatially regularized machine learning for task and resting-state fMRI. J Neurosci Methods. 2016 Jan 15;257:214-28. doi: 10.1016/j.jneumeth.2015.10.001

60. McClernon FJ, Conklin CA, Kozink RV1, Adcock RA, Sweitzer MM, Addicott M, Chou YH, Chen NK, Hallyburton MB, DeVito AM. Hippocampal and Insular Response to Smoking-Related Environments: Neuroimaging Evidence for Drug-Context Effects in Nicotine Dependence. Neuropsychopharmacology. 2016 Feb;41(3):877-85. doi: 10.1038/npp.2015.214.

61. Guhaniyogi S, Chu ML, Chang HC, Song AW, Chen NK*. Motion immune diffusion imaging using augmented MUSE (AMUSE) for high-resolution multi-shot EPI. Magn Reson Med. 2016 Feb;75(2): 639-52. doi: 10.1002/mrm.25624. (*corresponding author)

62. Wei H, Zhang Y, Gibbs E, Chen NK, Wang N, Liu C. Joint 2D and 3D phase processing for quantitative susceptibility mapping: application to 2D echo-planar imaging. NMR Biomed. 2016 Feb 17. doi: 10.1002/nbm.3501. [Epub ahead of print]

63. MacInnes JJ, Dickerson KC, Chen NK, Adcock RA. Cognitive Neurostimulation: Learning to Volitionally Sustain Ventral Tegmental Area Activation. Neuron. 2016 Mar 16;89(6):1331-42.

64. Meade CS, Cordero DM, Hobkirk AL, Metra BM, Chen NK, Huettel SA. Compensatory activation in fronto-parietal cortices among HIV-infected persons during a monetary decision-making task. Hum Brain Mapp. 2016 Mar 23. doi: 10.1002/hbm.23185. [Epub ahead of print]\

65. Chang HC, Chen NK*. Joint correction of Nyquist artifact and minuscule motion-induced aliasing artifact in interleaved diffusion weighted EPI data using a composite two-dimensional phase correction procedure. Magnetic Resonance Imaging 2016 In Press; DOI information: 10.1016/j.mri.2016.04.017 (*corresponding author)

66. Madden DJ, Parks EL, Tallman CW, Boylan MA, Hoagey DA, Cocjin SB, Johnson MA, Chou YH, Potter GG, Chen NK, Packard LE, Siciliano RE, Monge ZA, Diaz MT. Frontoparietal activation during visual conjunction search: Effects of bottom-up guidance and adult age. Hum Brain Mapp. 2017 Jan 4. doi: 10.1002/hbm.23509. [Epub ahead of print]

67. Chou YH, Sundman M, Whitson HE, Gaur P, Chu ML, Weingarten CP, Madden DJ, Wang L, Kirste I, Joliot M, Diaz MT, Li YJ, Song AW, Chen NK*. Maintenance and Representation of Mind Wandering during Resting-State fMRI. Sci Rep. 2017 Jan 12;7:40722. doi: 10.1038/srep40722. (*corresponding author)

68. Cordero DM, Towe SL, Chen NK, Robertson KR, Madden DJ, Huettel SA, Meade CS. Cocaine dependence does not contribute substantially to white matter abnormalities in HIV infection. J Neurovirol. 2017 Mar 1. doi: 10.1007/s13365-017-0512-5. [Epub ahead of print]

69. Madden DJ, Parks EL, Tallman CW, Boylan MA, Hoagey DA, Cocjin SB, Packard LE, Johnson MA,

Chou YH, Potter GG, <u>Chen NK</u>, Siciliano RE, Monge ZA, Honig JA, Diaz MT. Sources of disconnection in neurocognitive aging: cerebral white-matter integrity, resting-state functional connectivity, and white-matter hyperintensity volume. Neurobiol Aging. 2017 Jun;54:199-213. doi: 10.1016/j.neurobiolaging. 2017.01.027. Epub 2017 Mar 18.

70. Chu ML, Chang HC, Oshio K, <u>Chen NK*</u>. A single-shot T2 mapping protocol based on echo-split gradient-spin-echo acquisition and parametric multiplexed sensitivity encoding based on projection onto convex sets reconstruction. Magn Reson Med. 2017 May 7. doi: 10.1002/mrm.26696. [Epub ahead of print] (*corresponding author)

71. Sundman, M.H., <u>Chen, NK</u>., Subbian, V., Chou, YH., The bidirectional gut-brain- microbiota axis as a potential nexus between traumatic brain injury, inflammation, and disease, Brain, Behavior, and Immunity (2017), doi: http://dx.doi.org/10.1016/j.bbi.2017.05.009

72. Meade CS, Hobkirk AL, Towe SL, <u>Chen NK</u>, Bell RP, Huettel SA. Cocaine dependence modulates the effect of HIV infection on brain activation during intertemporal decision making. Drug and alcohol dependence. 2017; 178:443-451. NIHMSID: NIHMS891144

73. Bruce IP, Chang HC, Petty C, <u>Chen NK</u>, Song AW. 3D-MB-MUSE: A robust 3D multi-slab, multi-band and multi-shot reconstruction approach for ultrahigh resolution diffusion MRI. NeuroImage. 2017; 159:46-56.

74. Meade CS, Addicott M, Hobkirk AL, Towe SL, <u>Chen NK</u>, Sridharan S, Huettel SA. Cocaine and HIV are independently associated with neural activation in response to gain and loss valuation during economic risky choice. Addiction biology. 2017 Jul 6. doi: 10.1111/adb.12529;

75. Chang HC, Hui ES, Chiu PW, Liu X, <u>Chen NK</u>. Phase correction for three-dimensional (3D) diffusion-weighted interleaved EPI using 3D multiplexed sensitivity encoding and reconstruction (3D-MUSER). Magn Reson Med. 2017 Sep 23. doi: 10.1002/mrm.26944.

76. Chu ML, Chang HC, Chung HW, Bashir MR, Cai J, Zhang L, Sun D, <u>Chen NK*</u>. Free-breathing abdominal MRI improved by Repeated k-t-subsampling and artifact-minimization (ReKAM). Med Phys. 2017 Nov 17. doi: 10.1002/mp.12674. [Epub ahead of print] (*corresponding author)

77. Zhuang J, Madden DJ, Duong-Fernandez X, <u>Chen NK</u>, Cousins SW, Potter GG, Diaz MT, Whitson HE. Language processing in age-related macular degeneration associated with unique functional connectivity signatures in the right hemisphere. Neurobiol Aging. 2018 Mar;63:65-74.

78. Bell RP, Barnes LL, Towe SL, <u>Chen NK</u>, Song AW, Meade CS. Structural connectome differences in HIV infection: brain network segregation associated with nadir CD4 cell count. J Neurovirol. 2018 Apr 23. doi: 10.1007/s13365-018-0634-4. [Epub ahead of print].

79. <u>Chen NK*</u>, Chang HC, Bilgin A, Bernstein A, Trouard TP. A diffusion-matched principal component analysis (DM-PCA) based two-channel denoising procedure for high-resolution diffusion-weighted MRI. PLoS One. 2018 Apr 25;13(4):e0195952. doi: 10.1371/journal.pone.0195952. eCollection 2018. (*corresponding author)

80. <u>Chen NK*</u>, Chou YH, Sundman M, Hickey P, Kasoff WS, Bernstein A, Trouard TP, Lin T, Rapcsak SZ, Sherman SJ, Weingarten C. Alteration of diffusion-tensor MRI measures in brain regions involved in early stages of Parkinson's disease. Brain Connect. 2018 Jun 7. doi: 10.1089/brain.2017.0558. [Epub ahead of print] (*corresponding author)

81. Sonderer CM and <u>Chen NK*</u>. Improving the Accuracy, Quality, and Signal-To-Noise Ratio of MRI Parametric Mapping Using Rician Bias Correction and Parametric-Contrast-Matched Principal Component Analysis (PCM-PCA). Yale Journal of Biology and Medicine (in press) 2018. (*corresponding author)

Professional activities

Moderation for scientific meetings:
Moderator   Annual meeting for International Society for Magnetic Resonance in Medicine (2011)

Awards and special recognitions:
1999   Student Stipend Award, International Society for Magnetic Resonance in Medicine

Organizations and participation:
1996-present   Member   International Society for Magnetic Resonance in Medicine

Committee service:

2012-2015	Member	Medical Physics Graduate Program: Admissions Committee
2016	Member	Medical Physics Graduate Program: Task force for re-envision and expand the role of medical physics in medicine for broader impact
2017-2018	Member	7T Bruker MRI system Operations committee
2018	Chair	3T Human MRI system Operations committee
2018	Member	BME Graduate Studies Committee

Areas of research interest
1. Development of high-throughput and motion-immune clinical MRI for imaging challenging patient populations
2. Imaging of neuronal connectivity networks for studies of neurological diseases
3. High-fidelity and multi-contrast MRI guided intervention
4. Characterization and correction of MRI artifacts
5. Signal processing and algorithm development
6. MRI studies of human development

Invited lectures / oral presentations in conferences

February 2018: Invited lecture: "Improving the spatial-resolution of diffusion-weighted MRI (DWI)". Medical Imaging Grand Round; University of Arizona. (Tucson, USA).

August 2017: Invited Lecture: "High-resolution diffusion-weighted imaging technologies". American Association of Physicists in Medicine (AAPM) annual meeting (Denver USA)

May 2017 Oral presentation "High-resolution diffusion-weighted MRI for mapping brain connectivity": Spring workshop of ARIBI : Arizona Research Institute for Biomedical Imaging (Tucson USA)

April 2017: Invited Lecture: "Mapping of intrinsic connectivity networks of brains using neurological MRI". BME Seminar. University of Arizona (Tucson USA)

November 2016 Invited lecture: "Reduction of motion artifacts in MRI data". Brain Mapping Workshop. University of Arizona (Tucson USA).

October 2016 Invited lecture: "Neuroimaging and neuromodulation for studies of neurological diseases". Department of Biomedical Engineering, University of Arizona (Tucson USA).

October 2016 Invited lecture: "Dynamic and inherent MRI phase mapping with integrated image-space and k-space analyses". Department of Medical Imaging, University of Arizona (Tucson USA).

March 2016 Invited lecture: "High-resolution MRI for neurological studies". Medical Physics Seminar, Duke-Kunshan University. (Kunshan, China).

January 2016 Invited lecture: "High-resolution and motion-immune MRI for neurological studies". Biomedical Engineering Seminar, University of Arizona. (Tucson, USA).

May 2015 Invited lecture: "Phase Reconstruction Algorithms for Challenging MRI Applications". Annual

Conference of Center for Molecular and Biomolecular Imaging at Duke University. (Durham, USA).

Apr. 2015 Invited lecture: "Technical development of high-resolution and motion-immune MRI". Sunnybrook Research Institute. (Toronto, Canada).

Mar. 2015 Invited lecture: "Pushing the boundaries of human MRI with high-resolution and motion-immune MRI technologies". Biomedical Engineering Seminar of Duke University. (Durham, USA).

Sep. 2014 Invited lecture: "Reduction of motion-related artifacts in MRI data using motion-insensitive acquisition and advanced post-processing algorithms". MICCAI conference workshop: Intelligent Imaging: Linking MR Acquisition and Processing. (Boston, USA).

Feb. 2014 Duke Neurology Grand Round: " Mapping the neuronal connectivity networks with high-resolution MRI". (Durham, USA).

Apr. 2013 Oral presentation: "High-resolution diffusion weighted MRI enabled by multi-shot EPI with multiplexed sensitivity-encoding". Annual meeting of the International Society for Magnetic Resonance in Medicine (Salt Lake city, USA).

Mar. 2013 Invited lecture: " Mapping the Neuronal Connectivity Networks with High-Resolution MRI". Biomedical Engineering Seminar, University of Southern California (Los Angeles, USA).

Aug. 2012 Invited lecture: "Mapping of the intrinsic connectivity networks with high-resolution fMRI". Oriental Congress of Radiology (Shanghai, China).

Jul. 2012 Invited lecture: "Neuro MR imaging with high spatial-temporal-resolution". Biomedical Imaging Research Institute, Cedar-Sinai Medical Center (Los Angeles, USA).

Jan. 2012 Invited lecture: "High-resolution, high-quality and motion-insensitive echo-planar imaging". General Electric's Meeting of Global ASL and Engineering Team of EPI excellence (International Webniar).

Oct. 2011 Invited lecture: "Improved data acquisition and reconstruction strategies for echo-planar imaging based clinical scans". General Electric China (Beijing, China).

Oct. 2011 Workshop lecture: "Resting-state functional MRI analysis". Duke University Brain Imaging and Analysis Center (Durham, USA).

Jun. 2011 Invited lecture: "Neuronal connectivity network mapping for studies of neurological diseases". Department of Radiology, Mayo Clinic (Phoenix, USA).

Jun. 2011 Invited lecture: "Ultrafast MRI technologies". Barrow Neurological Institute. (Phoenix, USA).

May 2010 Oral presentation: "Reproducibility of resting-state functional connectivity". Annual meeting of the International Society for Magnetic Resonance in Medicine (Stockholm, Sweden).

Jul. 2009 Invited lecture: "Latest development on quantitative neuroimaging". MRI conference of the Brigham and Women's Hospital (Boston, USA).

Nov. 2008 Invited lecture: "Behavior-based connectivity analysis for resting-state functional MRI". University of North Carolina (Chapel Hill, USA).

Jul. 2008 Invited lecture: "MRI physics for clinicians". MRI conference of the Brigham and Women's Hospital (Boston, USA).

May 2008 Oral presentation: "Improved Image Reconstruction for Partial Fourier Gradient-Echo EPI". Annual meeting of the International Society for Magnetic Resonance in Medicine (Toronto, Canada).

Nov. 2007 Invited lecture: "Advanced Quantitative MR Imaging". International conference on Medical Imaging (Taichung, Taiwan)

Jul. 2007 Oral presentation: "High-quality Quantitative in vivo MR spectroscopy without Water Suppression". 2007 Congress of the World Association of Chinese Biomedical Engineers (Bangkok, Thailand).

Jul. 2007 Oral presentation: "Correction for gradient-echo EPI distortions with k-space data over-sampling and k-space energy spectrum analysis". 2007 Congress of the World Association of Chinese Biomedical Engineers (Bangkok, Thailand).

Mar. 2007 Invited lecture: "K-space energy spectrum analysis for echo-planar imaging". Duke University Medical Center (Durham, USA).

Jan 2006 Invited lecture: "Introduction to MRI principles and applications". Department of Electrical Engineering, National Taiwan University of Science and Technology (Taipei, Taiwan).

May 2005 Oral presentation: "Application of K-Space Energy Spectrum Analysis to Susceptibility Field Mapping and Distortion Correction in Gradient-Echo EPI". Annual meeting of the International Society for Magnetic Resonance in Medicine (Miami, USA).

Feb. 2005 Invited lecture: "Advanced MRI for studies of neurological system". Institutes of Biomedical Sciences, Academia Sinica (Taipei, Taiwan).

Feb. 2005 Invited lecture: "Principles and applications of functional MRI". National Health Research Institutes (Taipei, Taiwan).

Sep. 2004 Invited lecture: "Identification and Correction for EPI artifacts". Institute of Medicine. Research Centre Jülich (Jülich, Germany).

Apr. 2004 Invited lecture: "Phase variations in EPI based dynamic imaging and their impact on fMRI". MGH Martinos Center BrainMap Seminar (Boston, USA).

Jul. 2003 Invited lecture: "Advanced functional MRI technologies". Department of Radiology, Veterans General Hospital (Taipei, Taiwan).

May 2003 Oral presentation: "Diffusion mapping with serial asymmetric spin-echo EPI". Annual meeting of the International Society for Magnetic Resonance in Medicine (Toronto, Canada).

Jan 2001 Invited lecture: "Development and application of functional MRI technologies". Northwestern University Biomedical Engineering Seminar (Chicago, USA).

May 2000 Oral presentation: "An optimized distortion correction technique for echo planar imaging". Annual meeting of the International Society for Magnetic Resonance in Medicine (Denvor, USA).

May 1999 Oral presentation: "Correction for EPI distortions using multi-echo gradient-echo imaging". Annual meeting of the International Society for Magnetic Resonance in Medicine (Philadelphia, USA).

May 1996 Oral presentation: "Chemical shift EPI with real-time field-distortion correction". Annual meeting of the International Society for Magnetic Resonance in Medicine (New York, USA).

Active federal funding:

R01-NS102220   Chen (PI)   07/01/2018-03/31/2023
NIH
Development of High-Speed and Quantitative Neuro MRI Technologies for Challenging Patient Populations
In this project we will develop and integrate multidisciplinary approaches to maximize the translatability of advanced MRI technologies to clinical uses for challenging patients. The proposed technologies enables the acquisition of a complete set of high-resolution, artifact-free, multi- contrast and quantitative MR images from challenging patients (e.g., Parkinson's disease (PD) patients; stroke patients; pediatric populations) within clinically-feasible time.
Role: PI

R56-AG052576   Chen, Liu and Madden (multiple PI) 09/30/2017 – 08/31/2018
NIH
Quantitative susceptibility mapping of iron accumulation in neurocognitive aging
In this project we test a model of the influence of age-related deep gray matter (DGM) iron accumulation on neurocognitive function, proposing that age-related DGM iron contributes to oxidative stress and consequently to a decline in network connectivity.
Role: PI (multiple-PI)

R01-MH103790   Belger (PI); Chen (subcontact PI)   07/20/2015-06/30/2020
UNC Chapel Hill
Stress Regulation, Working Memory, and Cognitive Disorganization in Adolescence
We will examining the neural and physiological systems associated with working memory and stress regulation in adolescence, and their contribution to cognitive disorganization severity.
Role: subcontract PI

Completed federal research support (selected)

R01-NS074045   Chen (PI)   09/30/2011-06/30/2018
NIH
Imaging of Intrinsic Connectivity Networks
We propose high-resolution mapping of phenotype-specific intrinsic connectivity network (ICN) vulnerability, which will make it possible to investigate the mechanistic connection, at the level of neuronal network, among multiple phenotypes of neurological diseases.
Role: PI

R21-EB018419   Chen (PI)   09/25/2014 – 06/30/2018
NIH
Motion-immune neuro and body MRI for challenging patient populations
We propose to develop and integrate novel strategies to effectively eliminate motion-related artifact, which is the major bottleneck to achieving high-quality clinical MRI for challenging patient populations such as children, tremor-dominant Parkinson's patients and seriously ill patients among others.
Role: PI

R21-EB005690   Chen (PI)   07/14/2006 – 06/30/2010
NIH
K-space Energy Spectrum Analysis for Echo-planar Imaging
The goal of this project is to improve the quality and spatial accuracy of echo-planar imaging (EPI), so that accurate quantitative information can be derived from EPI based medical research and clinical diagnosis.
Role: PI

R03-EB003902   Chen (PI)   07/07/2004 – 06/30/2006

NIH
Artifact-free Diffusion Mapping with Echo-planar Imaging
The overall objective of the proposed project is to develop, optimize and validate an artifact-free diffusion mapping protocol based on echo-planar imaging (EPI). A successful outcome from this study will generate a robust and rigorously validated diffusion-mapping protocol free from EPI artifacts.
Role: <u>PI</u>

Previous participation of federal funded projects:

R01-AG039684   Madden (PI)   09/01/2011-08/31/2016
NIH
Neuroimaging of Visual Attention in Aging
The goal of this project is to use structural and functional brain imaging to assess age-related changes in attentional functioning in healthy adults.
Role: Co-Investigator

R24MH106048   Song (PI)   09/26/2014-06/30/2017
NIH
Path toward MRI with direct sensitivity to neuro-electro-magnetic oscillations
We plan to organize the much needed technological resources and interdisciplinary research team for developing the next generation MRI technology that can directly detect neuroelectric activities in the human brain.
<u>Role</u>: Co-Investigator

R01-NS075017   Song (PI)   02/15/2012-01/31/2017
NIH
High Fidelity Diffusion MRI for Children with Cerebral Palsy in Stem Cell Therapy
In this proposal, we aim to develop innovative diffusion-tensor imaging (DTI) techniques with greatly improved spatial resolution and fidelity, and to subsequently apply our innovative DTI acquisition methodology to better characterize the brain connectivity in children with cerebral palsy.
Role: Co-Investigator

R01-AG043438   Whitson (PI)   08/01/2013-06/30/2018
NIH
Cognitive changes and brain connectivity in age-related macular degeneration
The objective of this application is to determine how cognitive deficits in patients with age-related macular degeneration (AMD) are related to differences in functional connectivity and white matter integrity in the brain.
Role: Co-Investigator

R01-MH094743   Adcock (PI)   06/13/2011-03/31/2016
NIH
Motivated Memory as a Therapeutic Target
We expect these studies to provide a foundation for using cognitive and behavioral regulation of dopamine systems to prepare the brain for adaptive learning.
Role: Co-Investigator

1R21-DA036450   Meade (PI)   07/01/2013-06/30/2015
NIH
Effects of Cocaine and HIV on Decision Making Involving Potential Losses
The proposed R21 application will investigate the unique and additive effects of cocaine dependence and HIV infection on behavioral loss aversion and its underlying neural processes, and test whether loss aversion mediates the relationship between cocaine dependence and HIV risk behavior.
Role: Co-Investigator

1I01Cx000749-01A1   Morey (PI)   10/01/2013-09/30/2017

VA IPA 558/05B
Brain Systems for Fear Generalization and Threat Processing in PTSD
Investigate the functional neuroimaging correlates of hyperarousal and re-experiencing symptom clusters of PTSD using experimental fear learning, and threat-based arousal paradigms in the fMRI setting.
Role: Co-Investigator

No number assigned   Song (PI)   09/01/2014-08/31/2016
General Electric Company
High-Resolution Diffusion Weighted MRI
The objective of this research project is to adapt high-resolution diffusion MRI reconstruction methodology to the GE platform.
Role: Co-Investigator

No number assigned   Nicolelis (PI)   08/22/2014 – 08/21/2017
Hartwell Foundation
Autism as a Disease of Brain Circuit Timing
The main goal of this research proposal is to work from an innovative "brain circuit" framework to test the hypothesis that seizure-like activity underlies all key cardinal manifestations of autism.