

Sungho Tak

Korea Basic Science Institute
162 Yeongudanji-ro Ochang, Cheongju 28119, Republic of Korea
Tel: +82 (0)43 240 5057 • Email: stak@kbsi.re.kr

Current Appointments

01/2016–Present: Research Scientist, Korea Basic Science Institute

- 08/2019–Present: Research Center for Bioconvergence Analysis
- 01/2016–07/2019: Bioimaging Research Team

09/2018–Present: Adjunct Professor, Graduate School of Analytical Science and Technology
Chungnam National University

Education

01/2014–12/2015: Newton Postdoctoral Fellow, Wellcome Trust Centre for Neuroimaging
University College London

01/2012–12/2013: Postdoctoral Fellow, Rotman Research Institute at Baycrest Centre
University of Toronto

02/2008–08/2011: Ph.D., Bio and Brain Engineering
Korea Advanced Institute of Science and Technology (KAIST)

03/2006–02/2008: M.Sc., Bio and Brain Engineering
KAIST

03/2002–02/2006: B.Sc., Biomedical Engineering, Minor: Electronic Engineering
Kyung Hee University

Research Experience

01/2014–12/2015: Wellcome Trust Centre for Neuroimaging, University College London
Newton Postdoctoral Fellow
Supervisor: Prof. William Penny

- Dynamic causal modelling (DCM) for functional near-infrared spectroscopy (fNIRS)
- Sensor space group (random-effects) analysis for fNIRS data
Software development: https://www.nitrc.org/projects/spm_fnirs,
Mentor: Dr. Guillaume Flandin

01/2012–12/2013: Rotman Research Institute at Baycrest Centre, University of Toronto
Postdoctoral Fellow
Supervisor: Prof. Jean Chen

- Investigation of cerebrovascular effects on the resting-state BOLD signal and fMRI functional connectivity
- Implementation of GLM-based analysis pipeline for a dual-echo pseudocontinuous ASL data

03/2006–12/2011: Bio and Brain Engineering, KAIST
Research Assistant

Supervisor: Prof. Jong Chul Ye

- Statistical parametric mapping (SPM) for fNIRS
- Quantification of oxidative metabolism using simultaneous recording of fMRI and fNIRS

- Investigation of neurovascular coupling changes in patients with subcortical vascular dementia
- Application of compressive sensing method (FOCUSS) to projection reconstruction MRI
- Software development: https://www.nitrc.org/projects/nirs_spm

Publications

Journal Articles

- Lee, S, Kim, J, **Tak, S**, 2020. *Front. Behav. Neurosci.*, 14(154), 1-15
Effects of autonomous sensory meridian response on the functional connectivity as measured by functional magnetic resonance imaging.
- Lee, Y, Moon, H, **Tak, S**, Cheong, C, Park, Y, 2019. *Stereotact Funct Neurosurg*, 97(3), 169-175
Atrophic changes and diffusion abnormalities of affected trigeminal nerves in trigeminal neuralgia using 7T MRI.
- **Tak, S**, Noh, J, Cheong, C, Zeidman, P, Razi, A, Penny, WD, Friston, KJ, 2018. *J. Neurosci. Methods*, 305, 36-45
A validation of dynamic causal modelling for 7T fMRI.
- Bulgarelli, C, Blasi, A, Arridge, S, Powell, S, de Klerk, CCJM, Southgate, V, Penny, WD, **Tak, S**, Hamilton, A, 2018. *Neuroimage*, 175, 413-424
Dynamic causal modelling on infant fNIRS data: a validation study on a simultaneously recorded fNIRS-fMRI dataset.
- Lee, D, Yoo, J, **Tak, S**, Ye, JC, 2018. *IEEE Trans. Biomed. Eng.*, 65, 1985-1995
Deep residual learning for accelerated MRI using magnitude and phase networks.
- Jung, K, Friston, KJ, Pae, C, Choi, H, **Tak, S**, Choi, YK, Park, B, Park, CA, Cheong, C, Park, HJ, 2018. *Neuroimage*, 169, 485-495.
Effective connectivity during working memory and resting states: A DCM study.
- **Tak, S**, Uga, M, Flandin, G, Dan, I, Penny, WD, 2016. *J Neurosci Meth*, 264, 103-112,
Sensor space group analysis for fNIRS data.
- Lee, YB, Lee, J, **Tak, S**, Lee, K, Na, DL, Seo, SW, Jeong, Y, Ye, JC, and Alzheimer's Disease Neuroimaging Initiative, 2016. *Neuroimage*, 125, 1032-1045, Sparse SPM: Group sparse-dictionary learning in SPM framework for resting-state functional connectivity MRI analysis.
- **Tak, S**, Kempny, AM, Friston, KJ, Leff, AP, Penny, WD, 2015. *NeuroImage*, 111, 338-349,
Dynamic causal modelling for functional near-infrared spectroscopy.
- Lee, O **Tak, S**, Ye, JC, 2015. *IEEE Trans Med Imag*, 34, 1602-1615,
A unified sparse recovery and inference framework for functional diffuse optical tomography using random effect model.
- **Tak, S**, Polimeni, JR, Wang, JJ, Yan, L, Chen, JJ, 2015. *Brain Connectivity*, 5, 137-146,
Associations of resting-state fMRI functional connectivity with flow-BOLD coupling and regional vasculature.
- **Tak, S** and Ye, JC, 2014. *NeuroImage*, 85, 72-91,
Statistical analysis of fNIRS data: a comprehensive review.
- **Tak, S**, Wang, DJ, Polimeni, JR, Yan, L, Chen, JJ, 2014. *NeuroImage* 84, 672-680,
Dynamic and static contributions of the cerebrovasculature to the resting-state BOLD signal.
- Li, H, **Tak, S**, Ye, JC, 2012, *J Neurosci Meth* 204, 61-67,
Lipschitz-Killing curvature based expected Euler characteristics for p-value correction in fNIRS.
- **Tak, S**, Yoon, SJ, Jang, J, Yoo, K, Jeong, Y, Ye, JC, 2011, *NeuroImage* 55, 176-184.
Quantitative analysis of hemodynamic and metabolic changes in subcortical vascular dementia using simultaneous near-infrared spectroscopy and fMRI measurements.
- Lee, K, **Tak, S**, Ye, JC, 2011, *IEEE Trans Med Imag* 30(5), 1076-1089,

- A data-driven sparse GLM for fMRI analysis using sparse dictionary learning with MDL criterion.
- **Tak, S**, Jang, J, Lee, K, Ye, JC, 2010, *Phys Med Biol* 55, 3249-3269, Quantification of CMRO2 without hypercapnia using simultaneous near-infrared spectroscopy and fMRI measurements.
 - Ye, JC*, **Tak, S***, Jang, K, Jung, J, Jang, J, 2009, *NeuroImage* 44, 428-447. * Co-first author. NIRS-SPM: statistical parametric mapping for near-infrared spectroscopy.
 - Jang, K, **Tak, S**, Jung, J, Jang, J, Jeong, Y, Ye, JC, May/June 2009, *J Biomed Opt* 14(3), 034004-1:13, Wavelet minimum description length detrending for near-infrared spectroscopy.
 - Ye, JC, **Tak, S**, Han, Y, Park, HW, 2007, *Magn Reson Med* 57, 764-775, Projection reconstruction MR imaging using FOCUSS.
-

Manuscripts Submitted to Journal.....

- Kim, M, Lee, S, Dan, I, **Tak, S**, *under review*, *Neurophotonics*
Deep-learning-based motion artifact correction for functional near-infrared spectroscopy.
- **Tak, S**, Lee, S, Park, CA, Cheong, EN, Seok, JW, Sohn, JH, Cheong, C, *under review*, *Brain Connectivity*
Altered effective connectivity within the fronto-limbic circuitry in response to negative emotional task in female patients with major depressive disorder.

Research Grant

05/2016–12/2018: Grant for Development of Analysis Methods (Ref: T36800-T38800),

Korea Basic Science Institute (KBSI), Co-Investigator

- Development of neuroimaging biomarker for depressive tendency

07/2016–12/2016: Grant for Young Researchers (Ref: K36313), KBSI, Principal Investigator

06/2017–12/2018: Grant for Young Researchers (Ref: T37609-T38609), KBSI, Principal Investigator

- Estimation of brain connectivity and its underlying physiology from 7T MRI

01/2018–10/2019: Basic Research Programs in Science and Engineering,

National Research Foundation (NRF) Grant (Ref: PG2018004-2019087), Co-Investigator

03/2019–02/2022: Basic Research Programs in Science and Engineering,

NRF Grant (Ref: 2019R1C1C1011281), Principal Investigator

Patents

- Ye, JC, Jung, H, Yoo, J, **Tak, S**, Feb 1, 2011. US Patent, 7,881,511 (Reissue: July 1, 2014, RE44,981)
Method for super-resolution reconstruction using focal underdetermined system solver algorithm.
- Ye, JC and **Tak, S**, Jan 6, 2011. Korean Patent, 10-1008041
System and method for estimating cerebral blood flow and oxidative metabolism without hypercapnia using simultaneous measurements of fNIRS and fMRI.
- Ye, JC and **Tak, S**, Mar 17, 2008. Korean Patent, 10-0816018
Method for super-resolution reconstruction using focal underdetermined system solver algorithm.

Teaching and Supervision

Teaching.....

09/2018–Present: Lecturer, Chungnam National University

- Principle of MRI (Fall 2018, 2019, 2020)

- Analysis of functional MRI data (Spring 2019, 2020)

2014–2015: Teaching Assistant at SPM-fMRI Course, Wellcome Trust Centre for Neuroimaging, UCL

- Practical session for fMRI analysis (Oct 2014)
- Practical session for dynamic causal modelling (DCM) for fMRI (May 2014, 2015)
- Demo: DCM for fMRI (Oct 2015)

2006–2010: Teaching Assistant, Bio and Brain Engineering, KAIST

- Biomedical Imaging Systems (Fall 2006, 2008, 2010)
- Bio Signal Processing (Spring 2008, 2009)
- Digital Bio-Signal Processing (Fall 2007, 2009)

Student Supervision.....

09/2018–Present: Seonjin Lee, Ph.D. Program, Chungnam National University

Honors and Awards

01/2014–12/2015: Newton International Fellowship, Royal Society & British Academy

09/2002–02/2006: Scholarship based on Academic Achievement, Kyung Hee University

.....

04/11/2011: Poster Presentation Award, Korean Society for Human Brain Mapping (KHBM)

- Vascular artifact removal in fMRI analysis using simultaneous fMRI and NIRS measurements

05/11/2010: Oral Presentation Award, KHBM

- Quantitative analysis for impaired neurovascular and neurometabolic coupling in subcortical vascular dementia using simultaneous NIRS and fMRI

06/11/2009: Outstanding Paper Award, KHBM

- NIRS-SPM toolbox for near-infrared optical neuroimaging: recent progress

Editorial and Review Activities

06/2017–Present: Associate Editor, Neurophotonics

○ **Reviewer of the Journals:**

NeuroImage	Journal of Neuroscience Methods	Optics Express
Neurophotonics	Biomedical Optics Express	Journal of Biomedical Optics
Journal of Neural Engineering	J Cereb Blood Flow Metab	PLOS ONE
IEEE Trans Med Imag	IEEE J Sel Topics Signal Process	IEEE Trans Biomed Eng
Journal of Neuroimaging	Biomedical Engineering Letters	

.....

Last updated: 16th September, 2020