ITTHI CHATNUNTAWECH

Nanoinformatics and Artificial Intelligence Research Team Leader
National Nanotechnology Center, Thailand
itthi.cha@nanotec.or.th | GitHub | Google Scholar | Youtube Channel

EDUCATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA
Doctor of Philosophy in Electrical Engineering and Computer Science — June 2016
- Thesis: Acquisition and Reconstruction Methods for Magnetic Resonance Imaging

Master of Science in Electrical Engineering and Computer Science — June 2013
- Thesis: Model-Based Reconstruction of Magnetic Resonance Spectroscopic Imaging

CARNEGIE MELLON UNIVERSITY, Pittsburgh, PA
Bachelor of Science in Electrical and Computer Engineering — May 2011
Double Major in Biomedical Engineering — May 2011
- University Honors

RESEARCH INTERESTS

Artificial intelligence, machine learning, deep learning, mathematical optimization, signal processing, computer visions, medical imaging, data science

HONORS

Excellent Dissertation Award, National Research Council of Thailand — 2020
Awarded 200,000 THB and invitation to the incubation program of U.REKA Batch 2, Digital Ventures, Thailand — 2019
The 68th Lindau Nobel Laureate Meeting, Lindau, Germany — June 2018
Scholarship, The Ministry of Science and Technology, Royal Thai Government — 2006-2016

LEADERSHIP

Research Team Leader, Nanoinformatics and Artificial Intelligence, NANOTEC — 2021-
Treasurer, Thai Student Association at Massachusetts Institute of Technology — 2012-2013
Co-President, Thai Student Association at Carnegie Mellon University — 2009-2010
Committee, Thai Student Association at Carnegie Mellon University — 2007-2009

JOURNAL PUBLICATIONS

R. Raksasat, S. Teerapittayanon, S. Itthipuripat, K. Praditpornsilpa, A. Petchlorlian, T. Chotibut, C. Chunharas*, **I. Chatnuntawech***. Attentive Pairwise Interaction Network for AI-assisted Clock Drawing Test Assessment of Early Visuospatial Deficits. Under review in Artificial Intelligence in Medicine. ***corresponding authors.**

S. Itthipuripat, T. Phangwiwat, P. Punchongharn, Y. Wongsawat, **I. Chatnuntawech**, S. Wang, T. C. Sprague, C. Chunharas, G. F. Woodman. Sustained attention operates via dissociable neural mechanisms across different eccentric locations. In prep.

J. Cho*, B. Gagoski, T.H. Kim, Q. Tian, R. Frost, **I. Chatnuntawech**, B. Bilgic. Wave-Encoded Model-Based Deep Learning for Highly Accelerated Imaging with Joint Reconstruction. Bioengineering, 2022.

N. Ruengchaijatuporn†, **I. Chatnuntawech**†, S. Teerapittayanon, S. Sriswasdi, S. Itthipuripat, T. Chotibut*, C. Chunharas*. An Explainable Self-attention Deep Neural Network for Detecting Mild Cognitive Impairment Using Multi-input Digital Drawing Tasks. Alzheimer's Research & Therapy, 2022 †The authors contributed equally to this work. †**co-first authors.** *corresponding authors.

N. Kumchaiseemak, **I. Chatnuntawech**, S. Teerapittayanon, P. Kotchapansompote, T. Kaewlee, M. Piriyajitakonkij, T. Wilaiprasitporn, and S. Suwajanakorn. Toward Ant-Sized Moving Object Localization Using Deep Learning in FMCW Radar: A Pilot Study. IEEE Transactions on Geoscience and Remote Sensing, 2022.

S. Kalasung, K. Aiempanakit, **I. Chatnuntawech**, N. Limsuwan, K. Lertborworn, V. Patthanasettakul, M. Horprathum, N. Nuntawong, P. Eiamchai*. Geometrically Optimized Au-decorated ZnO Nanorod SERS Substrates for Trace Detection and Classifications of Pentaerythritol Tetranitrate. Sensors and Actuators B: Chemical, 2022.

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W. Jaroenram, **I. Chatnuntawech**, J. Kampeera, S. Pengpanich, P. Leaungwutiwong, B. Tondee, S. Sirithammajak, R. Suvannakad, P. Khumwan, S. Dangtip, N. Arunrut, S. Bantuchai, W. Nguitragool, S. Wongwaroran, P. Khanchaitit, J. Sattabongkot, S. Teerapittayanon*, W. Kiatpathomchai*. One-step colorimetric isothermal detection of COVID-19 with AI-assisted automated result analysis: a platform model for future emerging point-of-care RNA/DNA disease diagnosis. Talanta, 2022.

D. Polak, **I. Chatnuntawech***, J. Yoon, S. S. Iyer, C. Milovic, J. Lee, P. Bachert, E. Adalsteinsson, K. Setsompop, B. Bilgic. Nonlinear dipole inversion (NDI) enables robust quantitative susceptibility mapping (QSM). NMR in Biomedicine, 2020. ***corresponding author**.

B. Bilgic, **I. Chatnuntawech***, M. K. Manhard, Q. Tian, C. Liao, S. S. Iyer, S. F. Cauley, S. Y. Huang, J. R. Polimeni, L. L. Wald, K. Setsompop. Highly Accelerated Multishot EPI through Synergistic Machine Learning and Joint Reconstruction. Magnetic Resonance in Medicine, 2019. ***corresponding author**.

P. Reokrungruang, **I. Chatnuntawech**, T. Dharakul, S. Bamrungsap*. A simple paper-based surface enhanced Raman scattering (SERS) platform and magnetic separation for cancer screening. Sensors and Actuators B: Chemical, 2019.

J. Yoon, E. Gong, **I. Chatnuntawech**, B. Bilgic, J. Lee, W. Jung, J. Ko, H. Jung, K. Setsompop, G. Zaharchuk, E. Y. Kim, J. Pauly, J. Lee*. Quantitative susceptibility mapping using deep neural network: QSMnet. NeuroImage, 2018.

U. Yarach*, Y. H. Tung, K. Setsompop, M. H. In, **I. Chatnuntawech**, R. Yakupov, F. Godenschweger, O. Speck. Dynamic 2D self-phase-map Nyquist ghost correction for simultaneous multi-slice echo planar imaging. Magnetic Resonance in Medicine, 2018.

U. Yarach*, M. H. In, **I. Chatnuntawech**, B. Bilgic, F. Godenschweger, H. Mattern, A. Sciarra, O. Speck. Model-based Iterative Reconstruction for Single-shot EPI at 7T. Magnetic Resonance in Medicine, 2017.

I. Chatnuntawech*, P. McDaniel, S. F. Cauley, B. A. Gagoski, C. Langkammer, A. Martin, P. E. Grant, L. L. Wald, K. Setsompop, E. Adalsteinsson, B. Bilgic. Single-Step Quantitative Susceptibility Mapping with Variational Penalties. NMR in Biomedicine, 2016. ***corresponding author**.

I. Chatnuntawech*†, A. Martin†, B. Bilgic, K. Setsompop, E. Adalsteinsson, E. Schiavi. Vectorial Total Generalized Variation for Accelerated Multi-Channel Multi-Contrast MRI. Journal of Magnetic Resonance Imaging. Magnetic Resonance Imaging, 2016. **†co-first authors**, ***corresponding author**.

T. Chang, P. Shi, J.D. Steinmeyer, **I. Chatnuntawech**, P. Tillberg, K.T. Love, P.M. Eimon, D.G. Anderson, M.F. Yanik*. Organ-Targeted High-Throughput In Vivo Biologics Screen Identifies Materials for RNA Delivery. Integrative Biology, 2014.

I. Chatnuntawech*, B. Gagoski, B. Bilgic, S.F. Cauley, K. Setsompop, E. Adalsteinsson. Accelerated ^{1}H MRSI Using Randomly Undersampled Spiral-Based k-Space Trajectories. Magnetic Resonance in Medicine, 2014. ***corresponding author**.

B. Bilgic*, **I. Chatnuntawech**, A.P. Fan, K. Setsompop, S.F. Cauley, L.L. Wald, E. Adalsteinsson. Fast Image Reconstruction with L2-Regularization. Journal of Magnetic Resonance Imaging, 2014.

B. Bilgic*, **I. Chatnuntawech**, K. Setsompop, S.F. Cauley, L.L. Wald, E. Adalsteinsson. Fast Diffusion Spectrum Imaging Reconstruction with Trained Dictionaries. IEEE Transactions on Medical Imaging, 2013.

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J. Shum, A. Xu, **I. Chatnuntawech**, and E.A. Finol*. A Framework for the Automatic Generation of Surface Topologies for Abdominal Aortic Aneurysm Models. Annals of Biomedical Engineering, 2010.

CONFERENCE PAPERS

S. Kalasung, **I. Chatnuntawech**, V. Patthanasettakul, S. Limwichean, K. Lertborworn, M. Horprathum, N. Nuntawong, P. Eiamchai, K. Aiempanakit. Au-decorated ZnO Nanorod Arrays for SERS-active Substrates Towards Trace Detection and Classification of Pentaerythritol Tetranitrate. The 5th International Conference on Smart Materials and Nanotechnology, 2021.

K. Khowamnuaychok, C. Luangchaisri, **I. Chatnuntawech**, C. Muangphat. Studies on the uniformity and hexagonality of anodic aluminum oxide by image analysis methods. The 3rd Electronic and Green Materials International Conference, 2017.

I. Chatnuntawech, B. Bilgic, A. Martin, K. Setsompop, E. Adalsteinsson. Fast Reconstruction for Accelerated Multi-Slice Multi-Contrast MRI. IEEE International Symposium on Biomedical Imaging: From Nano to Macro, 2015.

B. Bilgic, **I. Chatnuntawech**, C. Langkammer, K. Setsompop. Sparse Methods for Quantitative Susceptibility Mapping. Wavelets and Sparsity XVI, SPIE, 2015.

CONFERENCE ABSTRACTS

N. Ruengchaijatuporn, S. S. Iyer, S. Schauman, Q. Chen, X. Cao, **I. Chatnuntawech**, K. Setsompop. Fast spatiotemporal subspace reconstruction of 3D-MRF with B0 correction and Deep-Learning-Initialized Compressed Sensing. Submitted to International Society for Magnetic Resonance in Medicine 31st Scientific Meeting, 2023.

U. Yarach, C. Liao, **I. Chatnuntawech**, S. Teerapittayanon, S. S. Iyer, T. H. Kim, J. Cho, K. Setsompop. BUDA Circular EPI Reconstruction Using Unrolled Un-Net as Priors. International Society for Magnetic Resonance in Medicine 30th Scientific Meeting, 2022.

J. Cho, B. Gagoski, T. H. Kim, Q. Tian, R. Frost, **I. Chatnuntawech**, B. Bilgic. Rapid Quantitative Imaging Using Wave-Encoded Model-Based Deep Learning for Joint Reconstruction. International Society for Magnetic Resonance in Medicine 30th Scientific Meeting, 2022.

J. Cho, Q. Tian, R. Frost, **I. Chatnuntawech**, B. Bilgic. Wave-Encoded Model-Based Deep Learning with Joint Reconstruction and Segmentation. International Society for Magnetic Resonance in Medicine 29th Scientific Meeting, 2021.

U. Yarach, F. Godenschweger, M. Bernstein, M.H. In, **I. Chatnuntawech**, K. Setsompop, O. Speck, J. Trzasko. Model-Based Iterative Reconstruction for Short-Axis Propeller EPI at 7T MRI. International Society for Magnetic Resonance in Medicine 29th Scientific Meeting, 2021.

S. Itthipuripat, T. Phangwiwat, P. Punchongharn, **I. Chatnuntawech**, C. Chunharas, T. C. Sprague, S. Wang, G. F. Woodman. Attention Operates Differently Across Eccentricities. Society for Neuroscience 50th Annual Meeting, 2021.

P. Sookprao, P. Wiwatphonthana, K. Lertladaluck, T. Wilaiprasitporn, N. Dilokthanakul, **I. Chatnuntawech**, C. Chunharas, J. Serences, S. Itthipuripat. Conflict dynamically shapes the focus of visual attention. Society for Neuroscience 50th Annual Meeting, 2021.

D. Polak, **I. Chatnuntawech**, J. Yoon, S. S. Iyer, K. Setsompop, B. Bilgic. VaNDI: Variational Nonlinear Dipole Inversion enables QSM without free parameters. International Society for Magnetic Resonance in Medicine 27th Scientific Meeting, Montreal, 2019.

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B. Bilgic, C. Liao, M. K. Manhard, Q. Tian, **I. Chatnuntawech**, S. S. Iyer, S. F. Cauley, T. Feiweier, S. Giri, Y. Hu, S. Y. Huang, J. R. Polimeni, L. L. Wald, K. Setsompop. Robust high-quality multi-shot EPI with low-rank prior and machine learning. International Society for Magnetic Resonance in Medicine 27th Scientific Meeting, Montreal, 2019.

B. Bilgic, **I. Chatnuntawech**, M. K. Manhard, Q. Tian, C. Liao, S. F. Cauley, S. Huang, J. Polimeni, L. L. Wald, K. Setsompop. NEATR-SMS for Highly Accelerated Multi-Shot EPI. ISMRM Workshop on Machine Learning, Part II, Washington, D.C., USA, 2018.

B. Bilgic, **I. Chatnuntawech**, S. F. Cauley, M. K. Manhard, L. L. Wald, K. Setsompop. Accelerated Multi-Shot EPI Through Machine Learning & Joint Reconstruction. ISMRM Workshop on Machine Learning, Pacific Grove, CA, USA, 2018.

B. Bilgic, S. F. Cauley, **I. Chatnuntawech**, M. K. Manhard, F. Wang, M. Haskell, C. Liao, L. L. Wald, K. Setsompop. Combining MR-Physics and Machine Learning to Address Intractable Reconstruction Problems. International Society for Magnetic Resonance in Medicine 26th Scientific Meeting, Paris, 2018.

B. Bilgic, B. Zhao, **I. Chatnuntawech**, L.L. Wald, K. Setsompop. Calibrationless Parallel Imaging in Multi Echo/Contrast Data. International Society for Magnetic Resonance in Medicine 25th Scientific Meeting, Hawaii, 2017.

I. Chatnuntawech, K. Tantisantisom, T. Boonkoom, K. Jiramitmonkon, P. Khanchaitit. Quantitative Analysis of Aqueous Methanol Solution Using Hyperspectral Imaging. NanoThailand, Thailand, 2016.

I. Chatnuntawech, P. McDaniel, S. F. Cauley, B. A. Gagoski, C. Langkammer, A. Martin, P. E. Grant, L. L. Wald, K. Setsompop, E. Adalsteinsson, B. Bilgic. TGV-Regularized Single-Step Quantitative Susceptibility Mapping. International Society for Magnetic Resonance in Medicine 24th Scientific Meeting, Singapore, 2016.

A. Martin, **I. Chatnuntawech**, B. Bilgic, K. Setsompop, E. Adalsteinsson, E. Schiavi. Total Generalized Variation Based Multi-Contrast Magnetic Resonance Image Reconstruction. Proceedings of XXIII CEDYA – XIII CMA, p. 135. Cadiz, Spain, 2015.

I. Chatnuntawech, B. Bilgic, A. Martin, K. Setsompop, E. Adalsteinsson. A Fast Reconstruction Algorithm for Accelerated Multi-Contrast MRI. International Society for Magnetic Resonance in Medicine 22nd Scientific Meeting, Toronto, ON, Canada, 2015.
A. Martin, **I. Chatnuntawech**, B. Bilgic, K. Setsompop, E. Adalsteinsson, E. Schiavi. Total Generalized Variation Based Joint Multi-Contrast, Parallel Imaging Reconstruction of Undersampled k-space Data. International Society for Magnetic Resonance in Medicine 22nd Scientific Meeting, Toronto, ON, Canada, 2015.

B. Gagoski, H. Ye, S.F. Cauley, H. Bhat, K. Setsompop, **I. Chatnuntawech**, A. Martin, Y. Jiang, M. Griswold, E. Adalsteinsson, P.E. Grant, L.L. Wald. Magnetic Resonance Fingerprinting for Fetal Imaging at 3T – Initial Results. International Society for Magnetic Resonance in Medicine 22nd Scientific Meeting, Toronto, ON, Canada, 2015.

K. Setsompop, B. Bilgic, A. Nummenmaa, Q. Fan, S.F. Cauley, S. Huang, **I. Chatnuntawech**, Y. Rathi, T. Witzel, L.L. Wald. Slice Dithered Enhanced Resolution Simultaneous Multislice (SLIDER-SMS) for High Resolution (700 um) Diffusion Imaging of the Human Brain. International Society for Magnetic Resonance in Medicine 22nd Scientific Meeting, Toronto, ON, Canada, 2015.

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I. Chatnuntawech, B. Gagoski, B. Bilgic, K. Setsompop, S.F. Cauley, E. Adalsteinsson. Accelerated MRSI Using Randomly Undersampled Spiral-Based k-Space Trajectories. International Society for Magnetic Resonance in Medicine 22nd Scientific Meeting, Milan, Italy, 2014.

I. Chatnuntawech, B. Bilgic, E. Adalsteinsson. Undersampled Spectroscopic Imaging with Model-based Reconstruction. International Society for Magnetic Resonance in Medicine 21st Scientific Meeting, Salt Lake City, Utah, USA, 2013.

I. Chatnuntawech, B. Bilgic, B. Gagoski, T. Kok, A.P. Fan, E. Adalsteinsson. Metabolite Map Estimation from Undersampled Spectroscopic Imaging Data Using N-Compartment Model. International Society for Magnetic Resonance in Medicine 21st Scientific Meeting, Salt Lake City, Utah, USA, 2013.

B. Bilgic, **I. Chatnuntawech**, K. Setsompop, S.F. Cauley, L.L. Wald, E. Adalsteinsson. Fast DSI Reconstruction with Trained Dictionaries. International Society for Magnetic Resonance in Medicine 21st Scientific Meeting, Salt Lake City, Utah, USA, 2013.

B. Bilgic, **I. Chatnuntawech**, A.P. Fan, E. Adalsteinsson. Regularized QSM in Seconds. International Society for Magnetic Resonance in Medicine 21st Scientific Meeting, Salt Lake City, Utah, USA, 2013.

S.F. Cauley, O.A. Abuhashem, B. Bilgic, **I. Chatnuntawech**, J. Cohen-Adad, K. Setsompop, L.L. Wald, E. Adalsteinsson. Low-Rank Basis Smoothing for the Denoising of Diffusion Weighted Images. International Society for Magnetic Resonance in Medicine 21st Scientific Meeting, Salt Lake City, Utah, USA, 2013.

B. Bilgic, **I. Chatnuntawech**, K. Setsompop, S.F. Cauley, L.L. Wald, E. Adalsteinsson. Fast Regularized Reconstruction Tools for QSM and DSI. ISMRM Workshop on Data Sampling & Image Reconstruction, Sedona, AZ, USA, 2013.

I. Chatnuntawech, A. Xu, J. Shum, E.A. Finol. Automatic Surface Mesh Generation, Refinement, and Smoothing of Human Abdominal Aortic Aneurysms. Proceedings of the 2009 Biomedical Engineering Society Annual Fall Meeting, Pittsburgh, PA, USA, 2009.

A. Xu, **I. Chatnuntawech**, B. Liao, J. Shum, E.A. Finol. Geometry Quantification of Electively Repaired Abdominal Aortic Aneurysms. Proceedings of the 2009 Biomedical Engineering Society Annual Fall Meeting, Pittsburgh, PA, USA, 2009.

TEACHING EXPERIENCES

Thailand National Metal and Materials Technology Center (Open to Public)
Co-Instructor, Machine Learning Workshop for Material Scientists 2022

- Gave formal lectures, developed courses structure, designed problem sets and quizzes
- Recorded lectures are available on Youtube

KASETSART UNIVERSITY, Bangkok, Thailand
Co-Instructor, Signal Processing in Medical Imaging Spring 2018

- Gave formal lectures, developed class structure, designed and graded problem sets and exams

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA, USA

Head Teaching Assistant, Signals and Systems Spring 2016

- Developed class structure, designed and graded problem sets and exams, and held weekly office hours
- Attained an MIT subject evaluation of 6.7 out of 7.0

Graduate Teaching Assistant, Data Acquisition and Image Reconstruction in MRI Fall 2014

- Developed class structure, graded exams and problem sets, held weekly office hours, and proctored laboratory sessions
- Attained an MIT subject evaluation of 6.8 out of 7.0

CARNEGIE MELLON UNIVERSITY, Pittsburgh, PA, USA

Teaching Assistant, Signals and Systems Fall 2010

- Developed class structure, graded exams and problem sets, and proctored biweekly laboratory sessions

THAI SCHOLAR SUMMER PROGRAM, Wolfeboro, NH, USA

Teaching Assistant, Brewster Academy Summer 2007

- Developed weekly lesson plans, graded problem sets, and held daily office hours

PEER REVIEWS

IEEE Transaction on Medical Imaging, Magnetic Resonance in Medicine, NMR in Biomedicine, International Society for Magnetic Resonance in Medicine.