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## CURRENT POSITION

09/2020 - present **MGH/MIT/HMS Athinoula A. Martinos Center for Biomedical Imaging**, Charlestown (MA), USA  
Department of Radiology – *Instructor*

10/2015 – 09/2020 **MGH/MIT/HMS Athinoula A. Martinos Center for Biomedical Imaging**, Charlestown (MA), USA  
Department of Radiology – *Post-Doctoral Research Fellow*  
*Dr. Vitaly Napadow's Lab* (<http://scholar.harvard.edu/napadow/home>)

10/2015 – 06/2020 **Logan University**, Chesterfield, MO, USA  
Department of Radiology – *Post-Doctoral Research Fellow*

## PAST POSITIONS

10/2014 – 4/2015 **MGH/MIT/HMS Athinoula A. Martinos Center for Biomedical Imaging**, Charlestown (MA), USA  
Department of Radiology – *Visiting Research Fellow*

3/2014 – 10/2015 **Politecnico di Milano**, Milano, Italy  
Department of Electronics, Information and Bioengineering (DEIB) – *Post-Doctoral Research Fellow*

5/2010 – 12/2010 **Politecnico di Milano**, Milano, Italy  
Department of Electronics, Information and Bioengineering (DEIB) – *Research Fellow*

## EDUCATION

1/2011 – 3/2014 **Politecnico di Milano**, Milano, Italy  
Department of Electronics, Information and Bioengineering (DEIB) – *PhD Programme (Graduated with merit)*  
*Project: "Enhancing the information content of BOLD fMRI data analysis through uni- and multi-modal approaches".*

10/2012 – 4/2013 **MGH/MIT/HMS Athinoula A. Martinos Center for Biomedical Imaging**, Charlestown (MA), USA  
Department of Radiology - *Visiting PhD Student*

- Point-process approach to autonomic data analysis.
- Neural correlates of autonomic nervous system (ANS-fMRI) during nausea and increasing deep pain.

3/2008 – 5/2010 **Politecnico di Milano**, Milano, Italy  
*Master Degree in Biomedical Engineering (110/110)*

- fMRI evaluation of brain connectivity analysis during epileptic seizures.

10/2004 – 3/2008 **Politecnico di Milano**, Milano, Italy  
*Bachelor Degree in Biomedical Engineering (102/110)*

## OTHER EXPERIENCE AND PROFESSIONAL MEMBERSHIPS

2015 - Member, Institute of Electrical and Electronic Engineers

- 2016 - Member, Organization for Human Brain Mapping
- 2018 - Member, International Association for the Study of Pain  
2019 - Member, Society for Neuroscience
- 2019 - Member, American Neurogastroenterology and Motility Society
- 2020 - Member, American Association for Anatomy

## HONORS

- 2020 Abstract selected for 2020 American Physiological Society (APS) Data NCARnation session at Experimental Biology
- 2019 American Neurogastroenterology and Motility Society (ANMS) Young Investigator Forum – Top 15 abstracts selected for pre-conference mentoring program, including complimentary registration and airfare/lodging coverage
- 2019 Digestive Disease Week (DDW) 2019 Poster of Distinction
- 2017 CinC 2017 Bill and Gary Sanders Poster Award
- 2016 National Science Foundation Abstract Travel Award, Organization for Human Brain Mapping Annual Meeting, Geneva, Switzerland
- 2014 - 2015 Full Regione Lombardia fellowship, including funding for research abroad

## INVITED PRESENTATIONS AND COURSES

- 2020 “Respiratory-gated auricular vagal afferent nerve stimulation (RAVANS): parameters optimization and potential applications”, invited talk  
BIO KOREA 2020, Seoul, Korea (event moved online due to COVID-19)
- 2020 “SPARC: Respiratory-gated transcutaneous vagus nerve stimulation modulates gastric function in functional dyspepsia”, invited talk at the 2020 APS “Data NCARnation” session  
Experimental Biology 2020, San Diego, CA (canceled due to COVID-19)
- 2020 “fMRI assessments for RAVANS parameters optimization and application to GI motility disorders”, invited talk in the “Underlying Physiology, Clinical Applications, and Commercialization of a Novel Technique for Transcutaneous Respiratory-Gated Auricular Vagus Afferent Nerve Stimulation (RAVANS)” session  
NYC Neuromodulation Online Conference
- 2019 Radiology Science Slam  
MGH Radiology Research Dinner, Boston, MA
- 2019 “4D MRI allows for dynamic estimation of gastric motility in humans”, invited talk in the “Young Investigator Forum” event  
American Neurogastroenterology and Motility Society (ANMS) Annual Meeting, Chicago, IL
- 2018 “Using fMRI to Optimize Transcutaneous Vagus Nerve Stimulation”, invited talk in the “Imaging Inside the Body Open House” event  
Real Colegio Complutense (RCC), Harvard University, Cambridge, MA
- 2018 “Transcutaneous Vagus Nerve Stimulation Optimized Using Functional MRI”, invited lecture within the “Chiropractic Grand Rounds” series  
Logan University, Chesterfield, MO

- 2017 “Respiratory-gated auricular vagal afferent nerve stimulation (RAVANS) effects on autonomic outflow in hypertension” (selected oral abstract)  
IEEE EMBC 2017, Jeju Island, Korea
- 2016 “Combining heart rate variability and ultrahigh field (7T) fMRI to reveal the brainstem circuitry supporting cardiovagal response to pain”, in the mini-symposium “Neuroimaging pain circuitries in the human brainstem with functional MRI” (invited talk)  
OHBM 2016, Geneva, Switzerland
- 2016 “Introduction to functional MRI, methods for causality assessment and autonomic neuroimaging”, in the PhD course “Advanced methods of biomedical signal and data processing” (invited lecture)  
Politecnico di Milano, Italy
- 2015 “Investigating autonomic correlates of continuous pain in the brainstem through high-field fMRI”, in the mini-symposium “Latest advances in neuroimaging of the central autonomic network: combining autonomic dynamics and brain imaging data”  
IEEE EMBC 2015, Milano, Italy
- 2013 “Nonlinear relationship between perception of deep pain and medial prefrontal cortex response is related to sympathovagal balance”, (selected oral abstract)  
IFBME MEDICON 2013, Sevilla, Spain

## OTHER SKILLS AND ABILITIES

- Languages:* Italian – *Native*  
English – *Fluent*
- Computing skills:* Matlab, fMRI data analysis softwares (SPM, Marsbar, MRICro/MRICron, FSL, Afni, Freesurfer), LabView, bash/sh scripting, MS Office, Windows/iOS/Linux.
- Data collection skills:* Brain MRI data at 3T and 7T (Siemens scanners). Stomach/abdomen MRI data at 3T (Siemens scanner). Peripheral autonomic data collection, including during MRI (systems: BIOPAC, ADInstruments, Finapres NOVA; softwares: AcqKnowledge, LabChart; signals: respiration, EKG, EDA, blood pressure, finger pulse, EGG)

## PUBLICATIONS

### Journal Papers

- A.D. Farmer, A. Strzelczyk, [...], R. Sclocco, [...], J. Koenig, “International Consensus Based Review and Recommendations for Minimum Reporting Standards in Research on Transcutaneous Vagus Nerve Stimulation (Version 2020)”, *Frontiers in Human Neuroscience*, in press.
- D.M. Ellingsen, K. Isenburg, C. Jung, J. Lee, J. Gerber, I. Mawla, R. Sclocco, K.B. Jensen, R.R. Edwards, J.M. Kelley, I. Kirsch, T.J. Kaptchuk, V. Napadow, “Dynamic brain-to-brain concordance and behavioral mirroring as a mechanism of the patient-clinician interaction”, *Science Advances*, in press.
- R. Sclocco, R.G Garcia, N.W. Kettner, H.P. Fisher, K. Isenburg, M. Makarovsky, J.A. Stowell, J. Goldstein, R. Barbieri, V. Napadow, “Stimulus frequency modulates brainstem response to respiratory-gated transcutaneous auricular vagus nerve stimulation”, *Brain Stimulation*, 13(4):970-978, 2020.
- G. Valenza\*, R. Sclocco\*, A. Duggento, L. Passamonti, V. Napadow, R. Barbieri, N. Toschi, “The central autonomic network at rest: uncovering functional MRI correlates of time-varying autonomic outflow”, *NeuroImage*, 197:383-390, 2019. (\*shared first authorship)

- V. Napadow, R. Sclocco, L.A. Henderson, "Brainstem Neuroimaging of nociception and pain circuitries", *Pain Reports*, 4(4):e745, 2019.
- R. Sclocco, R.G. Garcia, N.W. Kettner, K. Isenburg, H.P. Fisher, C.S. Hubbard, I. Ay, J.R. Polimeni, J. Goldstein, N. Makris, N. Toschi, R. Barbieri, V. Napadow, "The influence of respiration on brainstem and cardiovagal response to auricular vagus nerve stimulation: A multimodal ultrahigh-field (7T) fMRI study", *Brain Stimulation*, 12(4):911-921, 2019.
- S.M. Cornelson, R. Sclocco, N.W. Kettner, "Ulnar nerve instability in the cubital tunnel of asymptomatic volunteers", *Journal of Ultrasound*, Mar 12:1-8, 2019.
- R. Sclocco, F. Beissner, M. Bianciardi, J.R. Polimeni, V. Napadow, "Challenges and opportunities for brainstem neuroimaging with ultrahigh field MRI", *Neuroimage*, 168:412-426, 2018.
- R.G. Garcia, R.L. Lin, J. Lee, J. Kim, R. Barbieri, R. Sclocco, A. Wasan, R. Edwards, B.R. Rosen, N. Hadjikhani, V. Napadow, "Modulation of brainstem activity and connectivity by respiratory-gated auricular vagal nerve stimulation (RAVANS) in migraine patients", *Pain*, 158(8):1461-1472, 2017.
- N. Toschi, J. Kim, R. Sclocco, A. Duggento, R. Barbieri, B. Kuo, V. Napadow, "Motion sickness increases functional connectivity between visual motion and nausea-associated brain regions", *Auton Neurosci*, 202:108-113, 2017.
- R. Sclocco, F. Beissner, G. Desbordes, J.R. Polimeni, L.L. Wald, N.W. Kettner, J. Kim, R.G. Garcia, V. Renvall, A.M. Bianchi, S. Cerutti, V. Napadow, R. Barbieri, "Neuroimaging brainstem circuitry supporting cardiovagal response to pain - A combined heart rate variability / ultrahigh field (7T) fMRI study", *Phil Trans R Soc A*, 374(2067):20150189, 2016.
- R. Sclocco, J. Kim, R.G. Garcia, J.D. Sheehan, F. Beissner, A.M. Bianchi, S. Cerutti, B. Kuo, R. Barbieri, V. Napadow, "Brain circuitry supporting multi-organ autonomic outflow in response to nausea", *Cerebral Cortex*, 26(2):485-497, 2016.
- R. Sclocco, M.G. Tana, E. Visani, I. Gilioli, F. Panzica, S. Franceschetti, S. Cerutti, A.M. Bianchi, "EEG-informed fMRI Analysis during a Hand Grip Task: Estimating the Relationship between EEG Rhythms and the BOLD Signal", *Front Hum Neurosci*, 8:186, 2014.
- M.G. Tana, A.M. Bianchi, R. Sclocco, T. Franchin, S. Cerutti, A. Leal, "Parcel-based Connectivity Analysis of fMRI Data for the Study of Epileptic Seizure Propagation", *Brain Topogr*, 25(4):345-361, 2012.
- M.G. Tana, R. Sclocco, A.M. Bianchi, "GMAC: A Matlab Toolbox for Spectral Granger Causality Analysis of fMRI Data", *Comput Biol Med*, 42:943-956, 2012.
- R. Sclocco, S. Cerutti, E. Visani, I. Gilioli, F. Panzica, S. Franceschetti, A.M. Bianchi, "Motor Cortex Hemodynamic Modulation during a Hand Grip Task: Preliminary Results from an fMRI Study", *Int J Bioelectromagn*, 42(4), 2012.

### Conference Proceedings

- R. Staley, R.G. Garcia, J. Stowell, R. Sclocco, H. Fisher, V. Napadow, J.M. Goldstein, R. Barbieri, "Modulatory effects of respiratory-gated auricular vagal nerve stimulation on cardiovagal activity in hypertension", *Proceedings of IEEE EMBC 2020*, Montreal, Canada, July 2020.
- I. Fidone, R.G. Garcia, R. Sclocco, H. Fisher, J. Stowell, V. Napadow, R. Barbieri, "Effects of respiratory-gated auricular vagal afferent nerve stimulation (RAVANS) in hypertensive patients during the handgrip experiment", *Proceedings of ESCGO 2020*, Pisa, Italy, July 2020.

- R. Staley, J. Stowell, R.G. Garcia, R. Sclocco, H. Fisher, V. Napadow, J. Goldstein, R. Barbieri, "Frequency-dependent effects of exhalatory-gated transcutaneous vagus nerve stimulation on cardiac autonomic regulation in hypertension", *Proceedings of ESCGO 2020*, Pisa, Italy, July 2020.
- J. Stowell, R.G. Garcia, R. Staley, R. Sclocco, H. Fisher, V. Napadow, J. Goldstein, R. Barbieri, "Dose-optimization of Respiratory-gated Auricular Vagal Afferent Nerve Stimulation (RAVANS) for blood pressure modulation in hypertensive patients", *Computing in Cardiology*, 46, 2019.
- R. Sclocco, R.G. Garcia, H.P. Fisher, J.A. Stowell, K. Isenburg, N.W. Kettner, J.R. Polimeni, J. Goldstein, N. Makris, N. Toschi, R. Barbieri, V. Napadow, "Abstract# 54: Imaging medullary brainstem response to respiratory-gated auricular vagal afferent nerve stimulation (RAVANS) at ultrahigh-field (7T)", *Brain Stimulation*, 12(2):e19, 2019.
- H.P. Fisher, J.A. Stowell, R.G. Garcia, R. Sclocco, J. Goldstein, V. Napadow, R. Barbieri, "Effects of respiratory-gated auricular vagal nerve stimulation (RAVANS) on the modulation of blood pressure in hypertensive patients", *Computing in Cardiology*, 45, 2018.
- D. Ellingsen, C. Jung, J. Lee, K. Isenburg, J. Gerber, I. Mawla, R. Sclocco, R. Edwards, J. Kelley, I. Kirsch, T. Kaptchuk, V. Napadow, "Patient-clinical brain concordance in social mirroring circuitry supports placebo analgesia during pain treatment: a fMRI hyperscanning study", *The Journal of Pain*, 19(3):S5, 2018.
- R.G. Garcia, R. Sclocco, A. Gabriel, V. Napadow, R. Barbieri, "Respiratory-gated auricular vagal nerve stimulation lowers blood pressure in hypertensive patients", *Circulation*, 136(S1), A21014-A21014, 2017.
- R.G. Garcia\*, R. Sclocco\*, A. Gabriel, G. Valenza, V. Napadow, R. Barbieri, "Effects of respiratory-gated auricular vagal nerve stimulation (RAVANS) on nonlinear heartbeat dynamics in hypertensive patients", *Computing in Cardiology*, 44, 2017. (\*shared first-authorship)
- R. Sclocco, R.G. Garcia, A. Gabriel, N.W. Kettner, V. Napadow, R. Barbieri, "Respiratory-gated auricular vagal afferent nerve stimulation (RAVANS) effects on autonomic outflow in hypertension", *Proceedings of IEEE EMBC 2017*, Jeju Island, South Korea, July 2017.
- R. Sclocco, L. Citi, R.G. Garcia, S. Cerutti, A.M. Bianchi, B. Kuo, V. Napadow, R. Barbieri, "Combining sudomotor nerve impulse estimation with fMRI to investigate the central sympathetic response to nausea", *Proceedings of IEEE EMBC 2015*, Milano, Italy, August 2015.
- S. Coelli, R. Sclocco, R. Barbieri, G. Reni, C. Zucca, A.M. Bianchi, "EEG-based index for engagement level monitoring during sustained attention", *Proceedings of IEEE EMBC 2015*, Milano, Italy, August 2015.
- R. Sclocco, M.L. Loggia, R.G. Garcia, R. Edwards, J. Kim, S. Cerutti, A.M. Bianchi, V. Napadow, R. Barbieri, "Nonlinear Relationship between Perception of Deep Pain and Medial Prefrontal Cortex Response is Related to Sympathovagal Balance", *Proceedings of IFBME MEDICON 2013*, Sevilla, Spain, September 2013.
- R. Sclocco, M.G. Tana, E. Visani, I. Gilioli, F. Panzica, S. Franceschetti, S. Cerutti, A.M. Bianchi, "EEG-Informed fMRI Analysis during a Hand Grip Task", *Proceedings of IEEE EMBC 2012*, San Diego, CA, USA, September 2012.
- R. Sclocco, S. Cerutti, E. Visani, I. Gilioli, F. Panzica, S. Franceschetti, A.M. Bianchi, "Motor Cortex Hemodynamic Modulation during a Hand Grip Task: Preliminary Results from an fMRI Study", *Proceedings of 7<sup>th</sup> International Workshop on Biosignal Interpretation*, Como, Italy, July 2012.
- R. Sclocco, M.G. Tana, M. Re, E. Visani, I. Gilioli, F. Panzica, S. Franceschetti, S. Cerutti, A.M. Bianchi, "EEG-Informed fMRI Analysis during a Hand Grip Task", *GNB 2012*, Rome, Italy, June 2012.
- C. Cooreman, R. Sclocco, M.G. Tana, K. Vanderperren, E. Visani, F. Panzica, S. Franceschetti, S. Van Huffel, S. Cerutti, A.M. Bianchi, "BOLD Correlates of Alpha and Beta EEG-Rhythm during a Motor Task", *Proceedings of IEEE NER 2011*, Cancun, Mexico, April 2011.

**Abstracts**

- R. Sclocco, C. Nguyen, R. Staley, H. Fisher, A. Mendez, C. Velez, N. Kettner, V. Napadow, B. Kuo, “4D cine-MRI-assessed gastric function is modulated by respiratory-gated transcutaneous vagus nerve stimulation in functional dyspepsia”, *DDW 2020*, Chicago, IL, May 2020 (**selected for oral presentation**; conference canceled due to COVID19; abstract published).
- R. Sclocco, C. Nguyen, R. Staley, H.P. Fisher, C. Velez, A. Mendez, K.H. Lu, Z. Liu, M.P. Ward, T. Powley, N.W. Kettner, B. Kuo, V. Napadow, “SPARC: Respiratory-gated transcutaneous vagus nerve stimulation modulates gastric function in functional dyspepsia”, *EB 2020*, San Diego, CA, USA, April 2020 (**selected for media promotion**; conference canceled due to COVID19; abstract published).
- M.P. Ward, Z. Tan, R. Sclocco, B. Kuo, V. Napadow, T. Nowak, T.L. Powley, “SPARC\_Transcutaneous auricular vagal nerve stimulation increases antroduodenal motility in rat within a narrow range of stimulus parameters”, *EB 2020*, San Diego, CA, USA, April 2020 (conference canceled due to COVID19; abstract published).
- R. Sclocco, C. Nguyen, R. Staley, H. Fisher, C. Velez, A. Mendez, K.H. Lu, Z. Liu, M. Ward, T.L. Powley, N.W. Kettner, B. Kuo, V. Napadow, “Respiratory-gated transcutaneous vagus nerve stimulation increases 4D cine MRI-assessed stomach emptying in functional dyspepsia”, *SfN 2019*, Chicago, IL, USA, October 2019.
- V. Napadow, R. Sclocco, C. Nguyen, N.W. Kettner, H. Fisher, R. Staley, C. Velez, B. Kuo, “Neuroimaging and functional gastric response to respiratory-gated transcutaneous vagus nerve stimulation”, *NANS 2019*, Napa, CA, USA, October 2019.
- R. Sclocco, C. Nguyen, R. Staley, H.P. Fisher, A. Mendez, V. Napadow, B. Kuo, “4D MRI allows for dynamic estimation of gastric motility in humans”, *ANMS 2019*, Chicago, IL, USA, August 2019. (**selected for Young Investigators Forum Award**)
- R. Sclocco, C. Nguyen, R. Staley, H.P. Fisher, R.G. Garcia, C. Hubbard, A. Mendez, K. Lu, Z. Liu, M. Ward, T. Powley, B. Kuo, V. Napadow, “Respiratory-gated transcutaneous vagus nerve stimulation modulates dynamic MRI assessed stomach motility and emptying in humans”, *ISAN 2019*, Los Angeles, CA, USA, July 2019.
- R. Sclocco, R.G. Garcia, N.W. Kettner, H.P. Fisher, J.A. Stowell, K. Isenburg, N. Makris, J. Goldstein, N. Toschi, R. Barbieri, V. Napadow, “Stimulation frequency affects brain response to respiratory-gated auricular vagal nerve stimulation”, *OHBM 2019*, Rome, Italy, June 2019.
- G. Valenza\*, R. Sclocco\*, A. Duggento, L. Passamonti, V. Napadow, R. Barbieri, N. Toschi, “Brain correlates of linear and nonlinear autonomic outflow at rest”, *OHBM 2019*, Rome, Italy, June 2019. (\*shared first-authorship)
- N. Toschi, A. Duggento, R. Sclocco, R.G. Garcia, H.P. Fisher, J.A. Stowell, K. Isenburg, N. Makris, J. Goldstein, R. Barbieri, V. Napadow, “Causal modulation of instantaneous cardiovagal tone through autonomic brainstem nuclei”, *OHBM 2019*, Rome, Italy, June 2019.
- A. Anzolin, M. Yucel, R. Sclocco, K. Isenburg, J. Lee, T. Kaptchuk, V. Napadow, “EEG biomarkers for experienced versus observed/vicarious pain”, *OHBM 2019*, Rome Italy, June 2019.
- N. Priovoulos, F. Verhey, B. Poser, V. Napadow, R. Sclocco, D. Ivanov, H.I.L. Jacobs, “Respiratory-gated auricular vagal afferent nerve stimulation modulates the locus coeruleus in aged adults”, *OHBM 2019*, Rome, Italy, June 2019.
- R. Sclocco, C. Nguyen, R. Staley, H.P. Fisher, R.G. Garcia, C.S. Hubbard, A. Mendez, V. Napadow, B. Kuo, “3D MRI imaging of the stomach allows for dynamic volumetric and motility estimations in humans”, *DDW 2019*, San Diego, CA, USA, May 2019. (**poster of distinction**)

- R. Staley, R. Sclocco, R.G. Garcia, K. Isenburg, R. Barbieri, C. Hubbard, V. Napadow, B. Kuo, "Abnormal peripheral autonomic and central autonomic network response to aversive stimuli in cyclic vomiting syndrome", *DDW 2019*, San Diego, CA, USA, May 2019
- R. Sclocco, N.W. Kettner, R.G. Garcia, H.P. Fisher, J.A. Stowell, K. Isenburg, N. Makris, J. Goldstein, R. Barbieri, V. Napadow, "Stimulus frequency modulates cardiovagal and brain responses to respiratory-gated auricular vagal afferent nerve stimulation (RAVANS)", *SfN 2018*, San Diego, CA, USA, November 2018.
- C.S. Hubbard, E. Beaumont, R. Sclocco, R.G. Garcia, C. Jung, V. Napadow, I. Ay, "Neuromodulatory effects of auricular vagal nerve stimulation on caudomedial neurons in the nucleus tractus solitarius of the rat", *SfN 2018*, San Diego, CA, USA, November 2018.
- H.P. Fisher, Y. Maeda, N.W. Kettner, R. Sclocco, J. Kim, C. Malatesta, J. Gerber, J. Audette, V. Napadow, "S1 hand area functional connectivity is altered in carpal tunnel syndrome patients and linked with median nerve conduction velocity", *IASP 2018*, Boston, MA, USA, September 2018.
- R. Sclocco, R.G. Garcia, H.P. Fisher, J.A. Stowell, K. Isenburg, J.R. Polimeni, N.W. Kettner, N. Toschi, N. Makris, J. Goldstein, R. Barbieri, V. Napadow, "Ultrahigh-field (7T) fMRI localizes brainstem response to respiratory-gated auricular vagal afferent nerve stimulation (RAVANS) and its influence on cardiovagal outflow", *IASP 2018*, Boston, MA, USA, September 2018.
- R. Sclocco, R.G. Garcia, H.P. Fisher, J.A. Stowell, K. Isenburg, N.W. Kettner, J.R. Polimeni, J. Goldstein, N. Makris, N. Toschi, R. Barbieri, V. Napadow, "Imaging medullary brainstem response to respiratory-gated auricular vagal afferent nerve stimulation (RAVANS) at ultrahigh-field (7T)", *NANS 2018*, New York City, NY, USA, August 2018.
- R. Sclocco, R.G. Garcia, J.R. Polimeni, N.W. Kettner, K. Isenburg, N. Toschi, N. Makris, J. Goldstein, L.L. Wald, R. Barbieri, V. Napadow, "The brainstem response to respiratory-gated auricular vagal afferent nerve stimulation (RAVANS) at ultrahigh-field (7T) fMRI and its effect on vagal autonomic outflow", *SfN 2017*, Washington, DC, USA, November 2017.
- R. Sclocco, R.G. Garcia, J.R. Polimeni, I. Mawla, N. Toschi, L.L. Wald, R. Barbieri, N.W. Kettner, V. Napadow, "The brainstem circuitry of respiratory-gated auricular vagus nerve stimulation (RAVANS) at 7 Tesla", *OHBM 2017*, Vancouver, Canada, June 2017.
- N.W. Kettner, R. Sclocco, J.R. Polimeni, R.G. Garcia, I. Mawla, N. Toschi, L.L. Wald, R. Barbieri, V. Napadow, "Mapping the brainstem circuitry of transcutaneous vagus nerve stimulation (tvNS) in humans using ultrahigh-field (7T) fMRI", *SfN 2016*, San Diego, CA, USA, November 2016.
- R.G. Garcia, R.L. Lin, J. Lee, R. Sclocco, I. Mawla, M. Loggia, J.R. Polimeni, R.R. Edwards, A.D. Wasan, B.R. Rosen, N.W. Kettner, N. Hadjikhani, V. Napadow, "Evaluating brainstem mechanisms of respiratory-gated auricular vagus afferent nerve stimulation (RAVANS) for migraine with 3T and 7T fMRI", *IASP 2016*, Yokohama, Japan, October 2016.
- N. Toschi, J. Kim, R. Sclocco, A.H. Thurler, A. Duggento, R. Barbieri, B. Kuo, V. Napadow, "Motion sickness increased functional connectivity between visual motion and nausea-associated brain regions", *DDW 2016*, *Gastroenterology*, 150(4):S-528, 2016.
- R. Sclocco, F. Beissner, G. Desbordes, J.R. Polimeni, L.L. Wald, N.W. Kettner, J. Kim, R.G. Garcia, V. Renvall, R. Barbieri, V. Napadow, "Investigating brainstem circuitry supporting cardiovagal response to pain – a 7T fMRI study", *OHBM 2016*, Geneva, Switzerland, June 2016.
- R. Sclocco, F. Beissner, J.R. Polimeni, G. Desbordes, L.L. Wald, S. Cerutti, A.M. Bianchi, R. Barbieri, V. Napadow, "Investigating autonomic correlates of continuous pain in the brainstem through high-field fMRI", *IEEE EMBC 2015 Mini-symposium: "Latest advances in neuroimaging of the central autonomic network: combining autonomic dynamics and brain imaging data"*, Milano, Italy, August 2015.

- R. Barbieri, R. Sclocco, V. Napadow, “Revealing brain correlates of autonomic modulation by combining point process models of heartbeat dynamics with fMRI”, *IEEE EMBC 2015 Mini-symposium: “Latest advances in neuroimaging of the central autonomic network: combining autonomic dynamics and brain imaging data”*, Milano, Italy, August 2015.
- V. Napadow, R. Sclocco, J. Kim, B. Kuo, R. Barbieri, “Neuroimaging nausea to better understand central autonomic network physiology – a multi-modal approach”, *IEEE EMBC 2015 Mini-symposium: “Latest advances in neuroimaging of the central autonomic network: combining autonomic dynamics and brain imaging data”*, Milano, Italy, August 2015.
- R. Sclocco, E. Marchetta, V. Casaleggi, M. Tettamanti, A.M. Bianchi, G. Rizzo, “Removing Instantaneous Correlations between BOLD fMRI Time Series to Improve Connectivity Estimation”, *ISMRM 2014*, Milano, Italy, May 2014.
- B. Kuo, R. Sclocco, J. Kim, R.G. Garcia, J.D. Sheehan, A.H. Thurler, S. Castel, F. Beissner, R. Barbieri, V. Napadow, “Brain Circuitry of Autonomic Nervous System Outflow in Response to Nausea”, *DDW 2014, Gastroenterology*, 146(5), S-121, 2014.
- B. Kuo, J.D. Sheehan, J. Kim, R.G. Garcia, R. Sclocco, R. Barbieri, V. Napadow, “Insular Cortex Mediates Autonomic Nervous System Response to Nausea”, *DDW 2013, Gastroenterology*, 144(5), S-108, 2013.

## PRODUCTS

- “GMAC: a Matlab Toolbox for Spectral Granger Causality Analysis of fMRI data”, A Matlab-based open source toolbox for spectral Granger causality analysis of fMRI data, downloadable at [http://www.nitrc.org/projects/gmac\\_2012/](http://www.nitrc.org/projects/gmac_2012/) and described in Tana, Sclocco and Bianchi, 2012. The toolbox integrates standard fMRI preprocessing with multivariate spectral analysis of time series, in order to apply Granger causality to the BOLD signal. It was successfully applied to the investigation of seizure propagation in Tana et al., 2012.

## NARRATIVE REPORT

I have a background in bioengineering and data processing, with a specific training on neuroimaging data. During my PhD, I developed an interest in investigating the relationship between the central nervous system and the peripheral autonomic nervous system, which is still the main topic of my research work. Combining functional magnetic resonance imaging with instantaneous estimates of autonomic indices allowed me to explore the central circuitry underlying aversive stimuli, such as nausea or pain. During my initial post-doctoral years, I started exploiting the higher spatiotemporal resolution afforded by ultrahigh field (7 Tesla) fMRI to investigate the brainstem, and published a comprehensive review on the topic on a special issue of *NeuroImage*. I am currently studying the response of autonomic medullary nuclei to respiratory-gated transcutaneous vagus nerve stimulation (tVNS) with 7T and 3T functional MRI. Furthermore, I am collaborating on a longitudinal study evaluating the effect of tVNS on hypertension by looking at cardiovascular outcomes, as well as on two hyperscanning studies investigating the influence of patient-clinician relationship on placebo effects.

At the moment, I am expanding my research interests to the study of brain-gastric interactions with two new projects combining brain and stomach imaging to assess the effects of tVNS on gastric motility, both in healthy subjects and functional dyspepsia and gastroparesis patients.

During my years at Politecnico di Milano, I served as a Teaching Assistant in Biomedical Signal Processing (undergraduate curriculum in Biomedical Engineering), and I have tutored several bachelor and masters students working on their theses. As a post-doctoral researcher, I am contributing to the training and mentoring of junior members of my current lab, and I have



recently been invited to lecture PhD students at my former institution, as well as students and residents at Logan College (Chesterfield, MO).

With my collaborator Dr. Riccardo Barbieri, I proposed and organized a mini-symposium on the latest advances in neuroimaging of the central autonomic network, which was held at the IEEE EMBC International Conference in 2015. In the following year, I was an invited speaker at the annual meeting of the Organization for Human Brain Mapping in a symposium focused on brainstem imaging.

Roberta Scocco