

# Choong-Wan Woo

Center for Neuroscience Imaging Research  
 Institute for Basic Science  
 Department of Biomedical Engineering  
 Sungkyunkwan University  
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 (Last updated: September 2024)

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 Lab Instagram: @cocoanlab  
 Lab GitHub: <https://github.com/cocoanlab>

## MAJOR RESEARCH GOALS

- Understanding the neural mechanisms of pain and emotions
- Developing integrated brain models of human affective experiences and clinical outcomes
- Translating basic and computational neuroscience findings into clinical applications
- Building life- and neuroscience-inspired artificial general intelligence

## CURRENT POSITIONS

<b>Associate Director</b>	Dec 2022 ~ present
Center for Neuroscience Imaging Research, <b>Institute for Basic Science</b>	
<b>Associate Professor</b>	Sep 2023 ~ present
Department of Biomedical Engineering, <b>Sungkyunkwan University</b> (Suwon, South Korea)	

## EDUCATION and PREVIOUS POSITIONS

<b>Assistant Professor</b>	March 2017 ~ Aug 2023
Department of Biomedical Engineering, <b>Sungkyunkwan University</b> (Suwon, South Korea)	
<b>Research Associate/Postdoctoral Fellow</b>	Feb 2017
Cognitive and Affective Neuroscience Lab Institute of Cognitive Sciences, University of Colorado at Boulder, USA Advisor: Tor D. Wager, Ph.D.	
<b>Ph.D. (dual)</b>	Aug 2016
Psychology*/Cognitive Science** *Department of Psychology and Neuroscience, **Institute of Cognitive Sciences, University of Colorado at Boulder, USA Advisor: Tor D. Wager, Ph.D.	

PhD dissertation (submitted at Aug 2016)

*Brain Representations and Mechanisms of Pain Experience and Regulation: A Multivariate Pattern Approach* (committee: Tor D. Wager, Randall C. O'Reilly, Yuko Munakata, June Gruber, Tamara R. Sumner, Alaa Ahmed)

- Clinical Training** Full time 3-year Residency Training (Clinical Psychology) Feb 2010.  
Department of Psychiatry, Seoul National University Hospital  
Advisor: Min-Sup Shin, Ph.D.
- M.A.** Clinical Psychology Feb 2007.  
Department of Psychology, Seoul National University, South Korea  
Advisor: Seok-Man Kwon, Ph.D.
- MA Thesis at Seoul National University (Feb 2007)  
*The Relationship between Excessive Doubts due to Error Processing  
Dysfunction and Obsessive Compulsive Symptoms*
- B.S. (cum laude)** Biological Sciences Feb 2005.  
Seoul National University, South Korea

## **RESEARCH GRANTS**

- Institute for Basic Science, 2017-present  
Center for Neuroscience Imaging Research (IBS-R015-D1),  
Associate Director (2022-present)  
“Affective Neuroscience” Team leader (2017-present)
- Korea Institute of Science and Technology, KRW 100M/year 2021-2022  
Institutional Program, Principal Investigator  
“Developing brain-based biomarkers of the aging brain based on the computational models of the network-level homeostatic regulation” (2E30410-20-085)
- National Research Foundation of Korea, PI, KRW 500M/4 years 2019-2022  
“Development and validation of pain biomarkers based on functional neuroimaging and machine learning in human” (2019R1C1C1004512)
- Ministry of Science and ICT, Participating Investigator, KRW 100M/1 years 2020  
“BabyMind: Infant-Mimic Neurocognitive Developmental Machine Learning from Interaction Experience with Real World” (2019-0-01367- BabyMind)
- Ministry of Science and ICT, Participating Investigator, KRW 120M/2 years 2019-2020  
“Hub Construction for Brain Science” (18-BR-03)

## **HONORS and AWARDS**

- Scitech Korea Young Neuroscientist Award** (싸이텍코리아 젊은과학자상, 한국뇌신경과학회),  
Korean Society for Brain and Neural Sciences (Sep 2023)

**Top 100 R&D achievements** (국가연구개발 우수성과 100선),

Title: *“Developing neuroimaging-based pain biomarkers based on experimental pain”*  
Ministry of Science and ICT (Nov 2022)

**Kim Chan Award** (김찬 학술상, 대한통증연구회),

The Korean Pain Research Society (Nov 2022)

**Outstanding Achievement Award** (학술상 본상, 대한뇌기능매핑학회),

Korean Society for Human Brain Mapping (Nov 2021)

**Teaching Award,**

Sungkyunkwan University (Sep 2020)

**Jae-il Kim Young Scholar Award** (김재일 소장학자상, 한국심리학회),

Korean Psychological Association (Aug 2019)

**International Association for the Study of Pain (IASP) Travel Award (\$1,450),**

IASP, 16<sup>th</sup> World Congress on Pain, Yokohama, Japan (Sep 2016)

**Organization for Human Brain Mapping (OHBM) Abstract Travel Award (\$1,000),**

OHBM 2016 Annual meeting, Geneva, Switzerland (June 2016)

**Heyer Award,**

Dept. of Psychology and Neuroscience, University of Colorado at Boulder (May 2015)

**Carol B. Lynch Graduate Fellowship,**

University of Colorado at Boulder (May 2015)

**Invited scholar,**

European Pain School, Siena, Italy (June 2013)

**American Psychosomatic Society (APS) Travel Award for MacLean Scholars,**

American Psychosomatic Society (Jan 2013)

**Fulbright Graduate Study Award,**

Bureau of Educational and Cultural Affairs,  
United States Department of State, (2011 ~ 2013)

**High Academic Achievement Award,**

College of Natural Sciences, Seoul National University (2005)

**Undergraduate Student Research Award,**

Title: *“The Role of Contrast and Exposure Duration in Pattern Motion Perception”*  
Institute of Psychological Science, Seoul National University (2004)

**Scholarship for the Research Participating Program for Undergraduate Students,**

Title: *“Brain Imaging Method: Focusing on Functional Magnetic Resonance Imaging”*  
Center for Teaching and Learning, Seoul National University (2004)

**PROFESSIONAL AFFILIATIONS**

International Association for the Study of Pain (IASP); Society for Neuroscience (SfN);

Organization for Human Brain Mapping (OHBM); Social and Affective Neuroscience Society

(SANS); Korean Society for Human Brain Mapping (KHBM) (2019-2020 국제간사, 2021-2022

국제이사, 2023-2024 학술이사); The Korean Society for Brain and Neural Sciences (KSBNS) (2020 학술부위원장, 2022-2024 학술위원); Korean Society for Cognitive & Biological Psychology; Korean Clinical Psychology Association (2022-2023 59대 학술이사)

## **PROFESSIONAL ACTIVITIES**

Associate Editor     *Pain*  
 Consulting Editor     *Cognition & Emotion*  
 Ad-Hoc Reviewer     *Nature, Nature Neuroscience, Science Translational Medicine; Nature Communications; eLife; Pain; Pain Reports; Cognitive, Affective, and Behavioral Neuroscience; Human Brain Mapping; NeuroImage; NeuroImage Clinical; Journal of the American Academy of Child and Adolescent Psychiatry; Brain and Language; Journal of American Neuroradiology; Magnetic Resonance in Medicine; Neuroinformatics*

## **LICENSURE**

2010 ~ Present     Professional Clinical Psychologist (Korean Psychological Association)  
 2010 ~ Present     Mental Health Clinical Psychologist (Ministry of Health and Welfare, Republic of Korea)

## **RESEARCH**

### **Publications (Journal Articles):**

★ indicates Cocoon lab trainee; ☆ indicates Cocoon lab undergrad trainee

2024

- ★ Lee, D. H., ★ Lee, S., & **Woo, C.-W.** (*in press*). Decoding Pain: Uncovering the Factors that Affect Performance of Neuroimaging-Based Pain Models. *Pain*
- ★ Gim, S., ★ Lee, D. H., ★ Lee, S. & **Woo, C.-W.\*** (2024). Interindividual differences in pain can be explained by fMRI, sociodemographic, and psychological factors. *Nature Communications*, 15, 7883 (1-6). <https://doi.org/10.1038/s41467-024-51910-9>
- ★ Kim, J., ★ Gim, S., Yoo, S. B. M.\* & **Woo, C.-W.\*** (2024). A Computational Mechanism of Cue-Stimulus Integration for Pain in the Brain. *Science Advances*, 10(37), eado8230(1-13). <https://doi.org/10.1126/sciadv.ado8230>

\*co-corresponding author

- ★ Lee, S. A., ★ Lee, J.-J.\*, Han, J., Choi, M. M., Wager, T. D., & **Woo, C.-W.\*** (2024). Brain

Representations of Affective Valence and Intensity in Sustained Pleasure and Pain.

*Proceedings of the National Academy of Sciences*, **121**(25), e2310433121.

<https://doi.org/10.1073/pnas.2310433121>

\*co-corresponding author

- ★Kim, H. J., ★Lux, B. K., ★Lee, E., Finn, E. S., & **Woo, C.-W.** (2024). Brain decoding of spontaneous thought: Predictive modeling of self-relevance and valence using personal narratives. *Proceedings of the National Academy of Sciences*, **121**(14), e2401959121, <https://doi.org/10.1073/pnas.2401959121>
- Lim, J.-S.†, ★Lee, J.-J.†, Kim, G. H., Kim, H.-R. Shin, D. W., Lee, K.-J., Baek, M. J., Ko, E., Kim, B. J., Kim, S., Ryu, W.-S., Chung J., Kim, D.-E., Gorelick, P. B., **Woo, C.-W.\***, & Bae, H.-J.\* (2024). Subthreshold amyloid deposition, cerebral small vessel disease, and functional brain network disruption in delayed cognitive decline after stroke. *Frontiers in Aging Neuroscience*, **16**, 1430408. <https://doi.org/10.3389/fnagi.2024.1430408>

2023

- ★Kim, J., Andrews-Hanna, J. R., Eisenbarth, H. ★Lux, B. K., ★Kim, H. J., ★Lee, E., Lindquist, M. A., Losin, E. A. R., Wager, T. D., **Woo, C.-W.** (2023) A Dorsomedial Prefrontal Cortex-based Dynamic Functional Connectivity Model of Rumination, *Nature Communications*, **14**, 3540 (1-14), <https://doi.org/10.1038/s41467-023-39142-9>
- Jang, S., Lee, K.-R., Goh, G., Kim, D., Yun, G., Kim, N., ★Lux, B. K., **Woo, C.-W.**, Kim, H., Park, Y.-W. (2023) Design and field trial of EmotionFrame: exploring self-journaling experiences in homes for archiving personal feelings about daily events, *Human-Computer Interaction*, doi: 10.1080/07370024.2023.2219259

2022

- ★Kohoutová, L., Atlas, L. Y., Büchel, C., Buhle, J. T., Geuter, S., Jepma, M., Koban, L., Krishnan, A., ★Lee, D. H., ★Lee, S., Roy, M., Schafer, S. M., Schmidt, L., Wager, T. D., **Woo, C.-W.** (2022) Individual Variability in Brain Representations of Pain, *Nature Neuroscience*, **25**, 749-759, doi: 10.1038/s41593-022-01081-x
- ★Lee, J.-J., ★Lee, S., ★Lee, D. H., **Woo, C.-W.** (2022). Functional Brain Reconfiguration During Sustained Pain. *eLife*, **11**, e74463 (1-39), doi: 10.7554/eLife.74463
- ★Kim, B., Andrews-Hanna, J. R., ★Han, J., ★Lee, E., & **Woo, C.-W.** (2022). When self comes to a wandering mind: Brain representations and dynamics of self-generated concepts in spontaneous thought, *Science Advances*, **8**(35), eabn8616, doi: 10.1126/sciadv.abn8616
- Andrews-Hanna, J. R. \*, **Woo, C.-W.\***, Wilcox, R., Eisenbarth, H., ★Kim, B., ★Han, J., Losin, E.

- A. R., Wager, T. D. (2022) The Conceptual Building Blocks of Everyday Thought: Tracking the Emergence and Dynamics of Ruminative and Non-Ruminative Thinking, *Journal of Experimental Psychology: General*, 151(3), 628-642, doi:10.1037/xge0001096  
\*co-first author
- Kim, D., **Woo, C.-W.\***, Kim S.-G. (2022) Neural mechanisms of pain relief through paying attention to painful stimuli, *Pain*, 163(6), 1130-1138, doi:10.1097/j.pain.0000000000002464  
\*corresponding author
- Čeko, M., Kragel, P. A., **Woo, C.-W.**, López-Solà, M., Wager, T. D. (2022) Common and stimulus type-specific brain representations of negative affect, *Nature Neuroscience*, doi: 10.1038/s41593-022-01082-w
- Coll, M.-P., Slimani, H., **Woo, C.-W.**, Wager, T. D., Rainville, P., Vachon-Preseu, E., Roy, M. (2022). The neural signature of the decision value of future pain, *Proceedings of the National Academy of Sciences (PNAS)*, 119(23), e2119931119, doi: 10.1073/pnas.2119931119
- Kim, K. I., Jung, W. H., **Woo, C.-W.**, Kim, H. (2022). Neural signatures of individual variability in context-dependent perception of ambiguous facial expression, *NeuroImage*, 258, 1053-811, doi: 10.1016/j.neuroimage.2022.119355
- Lee, S.-H., Chey, J. Ahn, W.-Y., **Woo, C.-W.**, Youm, Y., Kim, H., Oh, N., Park, H., ★Gim, S., ★Lee, E., Choi, I. (2022). Psychological well-being and salivary markers of inflammation: The moderating effect of age, *Applied Psychology: Health and Well-being*, doi: 10.1111/aphw.12389
- Jiang, R., **Woo, C.-W.**, Qi, S., Wu, J., Sui, J. (2022). Challenges and Solutions for Interpreting Brain Biomarkers in Machine Learning-Based Predictive Neuroimaging. *IEEE SPM (Signal Processing Magazine)*, 39(4), 107-118, doi: 10.1109/MSP.2022.3155951
- Lee, J.-Y., You, T., Lee, C.-H., Im, G. H., Seo, H., **Woo, C.-W.**, Kim, S.-G. (2022) Role of Anterior Cingulate Cortex Inputs to Periaqueductal Gray for Pain Avoidance. *Current Biology*, 32, 1-14; doi:10.1016/j.cub.2022.04.090
- Petre, B., Kragel, P., Atlas, L. Y., Geuter, S., Jepma, M., Koban, L., Krishnan, A., Lopez-Sola, M., Losin, E. A. R., Roy, M., **Woo, C.-W.**, Wager, T. D. (2022) A multistudy analysis reveals that evoked pain intensity representation is distributed across brain systems. *PLoS Biology*, 20(5), e3001620; doi:10.1371/journal.pbio.3001620
- Han, X., Ashar, Y. K., Kragel, P., Petre, B., Schelkun, V., Atlas, Lauren Y., Chang, L. J., Jepma, M., Koban, L., Losin, E. A. R., Roy, M., **Woo, C.-W.**, & Wager, T. D. (2022) Effect sizes

and test-retest reliability of the fMRI-based Neurologic Pain Signature. *NeuroImage*, 247, 118844.; <https://doi.org/10.1016/j.neuroimage.2021.118844>

## 2021

- ★Lee, J.-J., ★Kim, H. J., Čeko, M. Park, B., ★Lee, S. A., Park, H., Roy, M., Kim, S.-G., Wager, T. D., & **Woo, C.-W.** (2021) A Neuroimaging Biomarker for Sustained Experimental and Clinical Pain, *Nature Medicine*, 27, 174-182; <https://doi.org/10.1038/s41591-020-1142-7>
- Lim, J.-S. <sup>\*,#</sup>, ★Lee, J.-J. <sup>\*</sup>, **Woo, C.-W.** <sup>#</sup> (2021) Post-stroke cognitive impairment: Pathophysiological insights into brain disconnectome from advanced neuroimaging analysis techniques, *Journal of Stroke*, 23(3), 297-311; doi:10.5853/jos.2021.02376
- <sup>\*</sup>co-first author, <sup>#</sup>co-corresponding author

## 2020

- ★Kohoutová, L., Heo, J., Cha, S., ★Lee, S. Moon, T., Wager, T. D., & **Woo, C. -W.** (2020) Interpreting machine learning models in neuroimaging: Towards a unified framework, *Nature Protocols*, 15, 1399-1435; <https://doi.org/10.1038/s41596-019-0289-5>
- Losin, E. A. R., **Woo, C. -W.**, Medina, N. A., Andrews-Hanna, J., Eisenbarth, H., Wager, T. D. (2020) Neural and Sociocultural Mediators of Ethnic Differences in Pain, *Nature Human Behaviour*. <https://doi.org/10.1038/s41562-020-0819-8>
- Lee, T. Y., Hwang, W. J., Kim, N. S., Park, I., Lho, S. K., Moon, S.-Y., Oh, S., Lee, J., Kim, M., **Woo, C.-W.**, Kwon, J. S. (2020) Prediction of psychosis: model development and internal validation of a personalized risk calculator, *Psychological Medicine*, 1-9; <https://doi.org/10.1017/S0033291720004675>
- Shin, W.-G., **Woo, C.-W.**, Jung, W. H., Kim, H., Lee, T. Y., Decety, J., Kwon, J. S. (2020) The neurobehavioral mechanisms underlying attitudes toward people with mental or physical illness, *Frontiers in Behavioral Neuroscience*, 14, 571225; <https://doi.org/10.3389/fnbeh.2020.571225>
- Park, B., ★Lee, J.-J., ★Kim, H. J., **Woo, C.-W.**, Park, H. (2020) A neuroimaging marker for predicting longitudinal changes in pain intensity of subacute back pain based on large-scale brain network interactions, *Scientific Reports*, 10, 17392; <https://doi.org/10.1038/s41598-020-74217-3>
- Silvestrini, N., Chen, J., Piché, M., Roy, M., Vachon-Preseau, E., **Woo, C.-W.**, Wager, T. D., & Rainville, P. (2020) Distinct fMRI patterns colocalized in the cingulate cortex underlie the after-effects of cognitive control on pain, *NeuroImage*, 217, 116898; <https://doi.org/10.1016/j.neuroimage.2020.116898>

Lim, J. S.\* , ★Lee, J. -J.\* , **Woo, C. -W.**, Song, J., Oh, M. -S., Yu, K. -H., Lee, B. -C. (2020)

Individual-level lesion-network mapping to visualize stroke lesion effects on the brain network, *Journal of Clinical Neurology*, 16(1), 116-123

\*co-first authors

Zheng, W., **Woo, C. -W.**, Yao, Z., Goldstein, P., Atlas, L. Y., Roy, M., Schmidt, L., Krishnan, A., Jepma, M., Hu, B. and Wager, T. D. (2020) Pain-Evoked Reorganization in Functional Brain Networks, *Cerebral Cortex*, 30(5), 2804-2822

2019

Jeong, S. -J., Lee, I. Y., Jun, B. O. , Ryu, Y. -J., Sohn, J. -W., Kim, S. -P., **Woo, C. -W.**, Koo, J. W. , Cho, I. -J., Oh, U., Kim, K., and Suh, P. -G. (2019) Korea Brain Initiative: Emerging Issues and Institutionalization of Neuroethics, *Neuron*, 101 (3), 390-393

★Hong, Y, ★Yoo, Y, ★Han, J., Wager, T. D. & **Woo, C. -W.** (2019) False-positive neuroimaging: Undisclosed flexibility in testing spatial hypotheses allows presenting anything as a replicated finding, *NeuroImage*, 195, 384-395

Matthewson, G.\* , **Woo, C. -W.\***, Reddan, M. C., & Wager, T. D. (2019) Cognitive self-regulation influences pain-related physiology, *PAIN (Editor's choice)*, 160, 2338-2349

\*co-first authors

2018

Kragel, P. A., Kano, M., Van Oudenhove, L., Ly, H. G., Dupont, P., Rubio, A., Delon-Martin, C., Bonaz, B. L. Manuck, S. B., Gianaros, P. J., Ceko, M., Losin, E. A. R., **Woo, C. -W.**, Nichols, T. E. & Wager, T. D. (2018) Generalizable representations of pain, cognitive control, and negative emotion in medial frontal cortex. *Nature Neuroscience*, 21, 283-289

2017

**Woo, C. -W.**, Chang, L. J. Lindquist, M. A., & Wager, T. D. (2017) Building better biomarkers: Brain models in translational neuroimaging. *Nature Neuroscience*, 20, 365-377

**Woo, C. -W.**, Schmidt, L., Krishnan, A., Jepma, M., Roy, M., Lindquist, M. A., Atlas, L. Y., & Wager, T. D. (2017) Quantifying cerebral contributions to pain beyond nociception. *Nature Communications*, 8, 14211

Wager, T. D. & **Woo, C. -W.** (2017) Imaging biomarkers and biotypes for depression. *Nature Medicine*. 23, 16-17. doi:10.1038/nm.4264

Koban, L., Kross, E., **Woo, C. -W.**, Luka Ruzic, L. & Wager, T. D. (2017) Frontal-brainstem pathways mediating placebo effects on social rejection. *Journal of Neuroscience*, 37 (13) 3621-3631



López-Solà, M., **Woo, C. -W.**, Pujol, J., Deus, J., Harrison, B. J., Monfort, J. & Wager, T. D.

(2017). Towards a neurophysiological signature for fibromyalgia. *PAIN*. 158(1):34-47

Lindquist, M. A., Krishnan, A., Lopez-Sola, M., Jepma, M., **Woo, C. -W.**, Koban, L., Roy, M.

Atlas, L. Y., Chang, L. J., Losin, E. A. R., Eisenbarth, H., Ashar, Y. K., Delk, Z., & Wager,

T. D. (2017). Group-regularized individual prediction: Theory and application to pain.

*NeuroImage*. 145, 274-287. doi: 10.1016/j.neuroimage.2015.10.074

## 2016

Krishnan, A., **Woo, C. -W.**, Chang, L. J., Ruzic, L., Gu, X., López-Solà, M., Jackson, P. L., Pujol,

J., Fan, J., & Wager, T. D. (2016). Somatic and vicarious pain are represented by dissociable

multivariate brain patterns. *eLife*. 5:e15166. doi:10.7554/eLife.15166.001

Vachon-Preseau, E. Roy, M., **Woo, C. -W.**, Kunz, M. Martel, M., Sullivan, M. J., Jackson, P. L.,

Wager, T. D., & Rainville, P. (2016). Multiple faces of pain: Effects of chronic pain on the

brain regulation of facial expression. *PAIN*. doi:10.1097/j.pain.0000000000000587

Wager, T. D. & **Woo, C. -W.** (2016). Issues in assessing reliability in pain neuroimaging. *PAIN*.

157, 1574-1578

**Woo, C. -W.**, & Wager, T. D. (2016). What reliability can and cannot tell us about pain report

and pain neuroimaging. *PAIN*. 157(3):511-3.

## 2015

**Woo, C. -W.**, & Wager, T. D. (2015). The predictive mapping approach in neuroimaging.

*Science (supplement), Advances in Computational Psychophysiology*, 18-21 (invited contribution)

**Woo, C. -W.**, & Wager, T. D. (2015). Neuroimaging-based biomarker discovery and validation.

*PAIN*. 156(8):1379-81.

**Woo, C. -W.**, Roy, M., Buhle, J. T. & Wager, T. D. (2015). Distinct brain systems mediate the

effects of nociceptive input and self-regulation on pain. *PLoS Biology*. 13(1): e1002036.

doi:10.1371/journal.pbio.1002036

### Commentary on this publication

Bray, N. (2015). Reappraising pain. *Nature Review Neuroscience*. 16, 124-125

Ploner, M., Bingel, U., & Wiech, K. (2015). Towards a taxonomy of pain modulations. *Trends in Cognitive Sciences*. 19, 180-182

Mano, H. & Seymour, B. (2015). Pain: A Distributed Brain Information Network? *PLoS Biology*. 13(1): e1002037

Wager, T. D. & **Woo, C. -W.** (2015). fMRI in analgesic drug discovery. *Science Translational*

*Medicine*. 7, 274fs6, doi:10.1126/scitranslmed.3010342

Losin, E. A. R., **Woo, C. -W.**, Krishnan, A., Wager, T. D., Iacoboni, M. & Dapretto, M. (2015).

Brain and psychological mediators of imitation: Sociocultural versus physical traits.

*Culture and Brain*. doi:10.1007/s40167-015-0029-9

Yamamoto, D. J., **Woo, C. -W.**, Wager T. D., Regner, M. & Tanabe, J. (2015) Influence of dorsolateral prefrontal cortex and ventral striatum on risk avoidance in addiction: a mediation analysis. *Drug and Alcohol Dependence*, 149, 10-17. doi: 10.1016/j.drugalcdep.2014.12.026

2014

**Woo, C. -W.**, Koban, L., Kross, E., Lindquist, M. A., Banich, M. T., Ruzic, L., Andrews-Hanna, J. R. & Wager, T. D. (2014). Separate neural representations for physical pain and social rejection. *Nature Communications*, 5, 5380. doi: 10.1038/ncomms6380

Commentary on this publication

Rogachov, A., Cheng, J. C., & DeSouza, D. D. (2015). Discriminating neural representations of physical and social pains: how multivariate statistics challenge the 'shared representation' theory of pain. *Journal of Neurophysiology*

**Woo, C. -W.**, Krishnan, A., Wager, T. D. (2014) Cluster-extent based thresholding in fMRI analyses: Pitfalls and recommendations. *NeuroImage*, 91, 412-419

2013

Wager, T. D., Atlas, L. Y., Lindquist, M. A., Roy, M., **Woo, C. -W.** & Kross, E. (2013). An fMRI-based Neurologic Signature of Physical Pain. *New England Journal of Medicine*, 368 (15), 1388-1397.

2010-2012

**Woo, C. -W.**, Kwon, S. -M., Lim, Y. -J., & Shin, M. -S. (2010). The obsessive-compulsive inventory-revised (OCI-R): psychometric properties of the Korean version and the order, gender, and cultural effects. *Journal of Behavior Therapy and Experimental Psychiatry*, 41, 220-227.

**Woo, C. -W.** & Shin, M. -S. (2010). Cognitive impairments in schizophrenia and psychotic bipolar disorder and their relation to psychotic symptoms. *Korean Journal of Clinical Psychology*, 29, 471-489.

**Woo, C. -W.**, Shin, M. -S., & Kwon, S. -M. (2010). Are obsessive beliefs specific to obsessive-compulsive symptoms? *Korean Journal of Clinical Psychology*, 29, 35-52.