# 2020 Fall "Advanced Affective Neuroscience" at SKKU GBME (graduate course)


- Lecturer: Choong-Wan Woo, Ph.D. Assistant professor (GBME).
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- Class: Friday 12:00-3:00PM (online, but offline later).
- Office hours: Wed 10:30-12:00, you can book a time in advance through https://choongwanwoo.youcanbook.me

## Download

You can download the class materials using the following command line.

```
$ git clone https://github.com/wanirepo/AffectNeuro_2018Spring
```

Once you clone the github repository, you can just type the following command to get the updated github repository.

```
$ git pull
```

Or you can download the repository as a zip file or you can also use GitHub Desktop. The class materials will be uploaded (e.g., lecture slides, assignments) before each class.

There is a good github tutorial: https://rogerdudler.github.io/git-guide/index.html

## What are the aims of this course?

Joyful, happy, sad, angry, disgusting, painful, bored... we experience these emotions all the time, and these experience keep changing every moment. How can we "define" emotions?

How can we "study" emotions? What are the "bodily factors" that influence emotions? How we "measure" bodily response of emotions? What are the "brain representations" of emotions? Are emotions same with affect or feelings? How can we model the "dynamics" of emotions? What are the underlying problems in emotional disorders, like anxiety and depression? etc. There are so many interesting questions about emotions. In this class, you will learn some key topics of affective neuroscience. We will also read and discuss some key papers (one or two papers per week) in affective neurosciences together.

# Course format and expectations

This course will consist of two parts--lectures and paper presentations. First, for the first 40 or so minutes, we will watch a lecture on an affective neuroscience topic together. The lecture could be my lecture (pre-recorded) or other affective neuroscientists' lecture. We will watch these videos together. Second, for the other 60-90 mins, two students will give presentations on the important papers on affective neuroscience, and we will have a discussion about the paper. Each student will present one paper. We will use English as the main language, but you can use Korean to ask questions and discuss.

# Evaluation

1. Attendance (40%)
2. Discussion participation (20%)
3. Presentation (20%)
4. Term paper (20%)

# Term paper

You can choose one among the following three options. (1) You can submit a research paper draft if your research topic is related to emotions. The paper should have at least three parts of the full article (e.g., Introduction, Methods, and Results, or Introduction, Results, and Discussion, etc.) (2) You can write about your own research idea on emotions with an experiment plan and design. In this case, you need to write introduction and method sections. ~5 pages (12 pt, line spacing 1.5) (3) You can write about a "perspective" type piece on any issues related to emotion research. Free format, ~5 pages.

# Schedule

| Week | Lecture | Paper |
|---|---|---|
| Week 1 (9/4) | Class overview | Paper Assignment |
| Week 2 (9/11) | Affective neuroscience | TBD |
| Week 3 (9/18) | Brain anatomy | TBD |
| Week 4 (9/25) | 건학기념일 (video) | no class |
| Week (10/2) | 추석 | no class |
| Week 5 (10/9) | 한글날 (video) | no class |
| Week 6 (10/16) | Affective brain systems | TBD |
| Week 7 (10/23) | Pleasure and desire | TBD |
| Week 8 (10/30) | mid-term | |
| Week 9 (11/6) | Touch and nociception | TBD |
| Week 10 (11/13) | Pain | TBD |
| Week 11 (11/20) | Emotion theories and brain | TBD |
| Week 12 (11/27) | Desire/emotion regulation, embodiment | TBD |
| Week 13 (12/4) | Unconscious affect | TBD |
| Week 14 (12/11) | Social Brain, Empathy | TBD |
| Week 15 (12/18) | Final | |

*Note.* Weekly plan described above can be adjusted as our class develops. (R): Review paper. (E): Empirical paper

# Books (not required)

- Andrew Fox, Regina Lapate, Alexander Shackman, Richard Davidson, "The Nature of Emotion: Fundamental questions", 2018
- Jorge Armony, Patrik Vulleumier, "The Cambridge Handbook of Human Affective Neuroscience", 2013
- Elizabeth Johnston & Leah Olson, "The Feeling Brain: The Biology and Psychology of Emotions", 2015
- Lisa Feldman Barrett, "How Emotions Are Made: The Secret Life of the Brain", 2017
- Jaak Panksepp, "Affective Neuroscience: The Foundations of Human and Animal

Emotions", 1998

# Papers (in progress)

[W2: integrate]

- Craig, A. D. 2002. “How Do You Feel? Interoception: The Sense of the Physiological Condition of the Body.” Nature Reviews. Neuroscience 3 (8): 655–66.
- Craig, a. D. Bud. 2009. “How Do You Feel–now? The Anterior Insula and Human Awareness.” Nature Reviews. Neuroscience 10 (1): 59–70.

[W3]

- Garcia, J., W. G. Hankins, and K. W. Rusiniak. 1974. “Behavioral Regulation of the Milieu Interne in Man and Rat.” Science 185 (4154): 824–31.
- Adolphs, Ralph. 2017. “How Should Neuroscience Study Emotions? By Distinguishing Emotion States, Concepts, and Experiences.” Social Cognitive and Affective Neuroscience 12 (1): 24–31.

[W6: integrate]

- MacLEAN, P. D. 1949. “Psychosomatic Disease and the Visceral Brain; Recent Developments Bearing on the Papez Theory of Emotion.” Psychosomatic Medicine 11 (6): 338–53.
- Pogliano, Claudio. 2017. “Lucky Triune Brain. Chronicles of Paul D. MacLean’s Neuro-Catchword.” Nuncius / Istituto E Museo Di Storia Della Scienza 32 (2): 330–75.

[W7]

- Berridge, Kent C. 2019. “Affective Valence in the Brain: Modules or Modes?” Nature Reviews. Neuroscience, February, 1.
- Damasio, Antonio, and Gil B. Carvalho. 2013. “The Nature of Feelings: Evolutionary and Neurobiological Origins.” Nature Reviews. Neuroscience 14 (2): 143–52.

[W9: integrate]

- Barrett, Lisa Feldman, and W. Kyle Simmons. 2015. “Interoceptive Predictions in the Brain.” Nature Reviews. Neuroscience 16 (July). https://doi.org/10.1038/nrn3950.
- Chanes, Lorena, and Lisa Feldman Barrett. 2016. “Redefining the Role of Limbic Areas in Cortical Processing.” Trends in Cognitive Sciences 20 (2): 96–106.

[W10]

- Craig, A. D. (bud). 2003. “PAIN MECHANISMS: Labeled Lines Versus Convergence in Central Processing.” Annual Review of Neuroscience 26 (1): 1–30.

- Raja, Srinivasa N., Daniel B. Carr, Milton Cohen, Nanna B. Finnerup, Herta Flor, Stephen Gibson, Francis J. Keefe, et al. 2020. “The Revised International Association for the Study of Pain Definition of Pain: Concepts, Challenges, and Compromises.” Pain Articles in Press (July). https://doi.org/10.1097/j.pain.0000000000001939.

[W11]

- Barbas, H. (2015) General cortical and special prefrontal con- nections: principles from structure to function. Annu. Rev. Neuro- sci. 38, 269–289
- Mesulam, M. M. 1998. “From Sensation to Cognition.” Brain: A Journal of Neurology 121 ( Pt 6) (June): 1013–52.

[W12]

- Mobbs, Dean, Ralph Adolphs, Michael S. Fanselow, Lisa Feldman Barrett, Joseph E. LeDoux, Kerry Ressler, and Kay M. Tye. 2019. “Viewpoints: Approaches to Defining and Investigating Fear.” Nature Neuroscience 22 (8): 1205–16.
- Treede, Rolf-Detlef, Winfried Rief, Antonia Barke, Qasim Aziz, Michael I. Bennett, Rafael Benoliel, Milton Cohen, et al. 2019. “Chronic Pain as a Symptom or a Disease: The IASP Classification of Chronic Pain for the International Classification of Diseases (ICD-11).” Pain 160 (1): 19–27.

[W13]

- Man, Kingson, and Antonio Damasio. 2019. “Homeostasis and Soft Robotics in the Design of Feeling Machines.” Nature Machine Intelligence 1 (10): 446–52.
- Saper, Clifford B. 2002. “The Central Autonomic Nervous System: Conscious Visceral Perception and Autonomic Pattern Generation.” Annual Review of Neuroscience 25 (January): 433–69.

[W14]

- Lisa Feldman Barrett, Batja Mesquita, and Eliot R. Smith, 2010, "The Context Principle", The Mind in Context, Chapter 1, p.1-24
- Buckner, Randy L., and Daniel C. Carroll. 2007. “Self-Projection and the Brain.” Trends in Cognitive Sciences 11 (2): 49–57.

- Melzack, Ronald, and Patrick D. Wall. 1965. “Pain Mechanisms: A New Theory.” Science 150 (3699): 971–79.

    - Melzack, R. 1999. “From the Gate to the Neuromatrix.” Pain Suppl 6 (August): S121–26.

- Ledoux

- Price, Joseph L., and Wayne C. Drevets. 2012. “Neural Circuits Underlying the Pathophysiology of Mood Disorders.” Trends in Cognitive Sciences 16 (1): 61–71.

James Gross

Berridge

Adolphs

Melzack

- Price2012(R): Neural circuits underlying the pathophysiology of mood disorders, TICS
- Saper2002(R): The central autonomic nervous system: Conscious Visceral Perception and Autonomic Pattern Generation, Annu Rev Neurosci
- Berridge2015(R): Pleasure Systems in the Brain, Neuron
- Rutledge2014(E): A computational and neural model of momentary subjective well-being, PNAS
- Melzack1999(R): From the gate to the neuromatrix, PAIN
- Segerdahl2015(E): The dorsal posterior insula subserves a fundamental role in human pain, Nat Neurosci
- Salomons2015(E): The “Pain Matrix” in Pain-Free Individuals, JAMA Neurol
- Tracey2010(R): Getting the pain you expect: mechanisms of placebo, nocebo and reappraisal effects in humans, Nat Med
- Wager2013(E): An fMRI-Based Neurologic Signature of Physical Pain, NEJM
- Geuter2017(R): The Cognitive Neuroscience of Placebo Effects: Concepts, Predictions, and Physiology, Annu Rev Neurosci
- Leknes2008(R): A common neurobiology for pain and pleasure, NRN
- Goldstein2018(E): Brain-to-brain coupling during handholding is associated with pain reduction, PNAS
- Gross2011(R): Emotion Generation and Emotion Regulation: One or Two Depends on Your Point of View, Emotion Review
- Kragel2016(E): Decoding Spontaneous Emotional States in the Human Brain, PLoS Biol
- Etkin2015(R): The neural bases of emotion regulation, NRN (bonus: Raio's commentary + Etkin's reply)
- Gilead2016(E): Self-regulation via neural simulation, PNAS
- Giuliania2018(R): Neural predictors of eating behavior and dietary change, ANYAS
- Lim2016(E): The child brain computes and utilizes internalized maternal choices, Nat Comms

- Niedenthal2007(R): Embodying Emotion, Science
- Nummenmaa2013(E): Bodily maps of emotions, PNAS
- Berridge2003(R): What is an unconscious emotion?, Cognition and Emotion
- Jensen2015(E): Classical conditioning of analgesic and hyperalgesic pain responses without conscious awareness, PNAS
- Herry2014(R): Encoding of fear learning and memory in distributed neuronal circuits, Nat Neurosci
- Onat2015(E): The neuronal basis of fear generalization in humans, Nat Neurosci
- Reeck2015(R): The Social Regulation of Emotion: An Integrative, Cross-Disciplinary Model, TICS
- deBerker2016(E): Computations of uncertainty mediate acute stress responses in humans, Nat Comms

Further readings:

- Clore & Ortony
- Melzack 1965
- Ashar 2017
- Navratilova 2014
- Kragel 2016 TICS
- Barrett 2015
- Heatherton 2011 TICS
- Ochsner 2005