PHIL 8130: Philosophy of Neuroscience Fall 2020 (CRN 93298) Online Synchronous Tues. 4:30-7:00pm

Instructor: Professor Daniel Weiskopf
Email: dweiskopf@gsu.edu
Office hours: Fri. 9-12 (via WebEx)

COURSE OVERVIEW

Course overview

This seminar will cover recent philosophical work on neuroscience from a practice-oriented approach. We will focus on unpacking how the field's epistemic, technological, representational, and social practices contribute to our understanding of complex systems such as the mind/brain. Topics addressed include: causation, explanation, and experimentation; the strengths and weaknesses of mechanistic, dynamical, and network modeling; reductionism, anti-reductionism, and the unification of neuroscience with psychology; the scope and limits of neuroimaging; the rise of "big data" in neuroscience; the roles of instruments and tool development; "brain reading," neuroprediction, and the sociopolitical implications of neuroscience.

Course objectives

The goal of this course is to acquaint students with some of the current discourse and debates in the philosophy of neuroscience, and to sharpen their skills at analyzing the theoretical problems that art poses. Students will be expected to know the contents of the readings, and be able to explain and critique them orally and in writing.

Prerequisites

Graduate standing or permission of instructor.

READINGS AND ASSIGNMENTS

<u>Assignments</u>

The points available for the class break down as follows (no extra credit):

Discussion questions 25% Final paper 75%

Seminars are discussion-based. While you are not graded on attendance or participation, I expect you to attend every class. You are expected to be ready to talk about the readings in some depth, and to be a thoughtful, regular participant in discussion. (Of course, while we'll be meeting virtually, normal standards of good classroom behavior still apply.)

The assignments for the class are as follows:

Discussion questions. These are tightly focused 200 word questions pertaining to one of the upcoming week's readings. Ten of these are due during the semester (no more than one per week). They will be posted to the online discussion boards by noon on the Monday prior to our class meetings. We'll both refer back to these posts during our discussions, and they'll be kept open for commentary throughout the course.

Final paper. This is a research paper of between 3000 and 5000 words. In this paper you are expected to motivate, develop, and defend a substantial position of your own. The topic may be anything that we have covered in class, or that bears a plausible, well-motivated relation to the course content. Paper topics must be cleared with me in advance, and you must meet with me to discuss your proposed final paper topic no later than **11/6/20**. The paper will be due at noon on **Fri., 12/4/20**.

COURSE POLICIES AND PROCEDURES

Technical support

Lateness policy

In cases of illness, family medical emergency, or other extenuating circumstances I will accept late assignments. I don't require documentation for this, but please notify me when you are requesting permission to turn in an assignment late and we will work out a plan of accommodation.

Special accommodations

All efforts will be made to accommodate students with special needs. Students who wish to request accommodations for a disability may do so by connecting with the Access and Accommodations Center (AACE). Students may be accommodated upon instructor receipt of an accommodation notice from AACE (see How to Connect).

Basic needs statement

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable us to provide resources that we may possess. The Embark program at GSU provides resources for students facing homelessness and Pantry provides resources for students facing food insecurity.

Academic honesty

Acceptable academic conduct is laid out in the GSU <u>Code of Conduct</u>. All participants in the course are expected to abide by this code. **If you violate the academic conduct code, you fail the course**. The most important aspect of the code is that the work that you submit should be your own. There are specific guidelines in the code on what makes something plagiarism. Contact me if you have any further questions about the code itself and how it applies to our class.

BACKGROUND READINGS

Looking at these is optional. These are chosen to get you up to speed on contemporary theory and modeling, technology, experimental design, and data analysis in neuroscience, if you want to delve deeper into any of these topics. Most require some mathematical competence, although all are manageable for dedicated non-experts. Entries marked with '*' are more technical or advanced.

Bandettini's book in particular is a nice short intro to fMRI, which remains the fundamental technology of modern cognitive neuroscience despite the emergence of many complementary modalities in recent years. Kandel et al. remains the gold standard survey of neuroscience from genes, molecules, and cells through pathways, systems and networks, covering anatomy, physiology, development, function, and pathology.

*Ashby, F. G. (2019). Statistical Analysis of fMRI Data (2nd ed.). Cambridge: MIT Press.

Bandettini, P. A. (2020). FMRI. Cambridge: MIT Press.

*Dayan, P., & Abbott, L. F. (2005). *Theoretical Neuroscience: Computational and Mathematical Modeling of Neural Systems* (Rev. ed.). Cambridge: MIT Press.

*Elster, A. D. Questions and Answers in MRI. https://www.mriquestions.com

Fornito, A., Zalesky, A., & Bullmore, E. T. (2016). *Fundamentals of Brain Network Analysis*. Elsevier/Academic Press.

Kandel, E. R., Schwartz, J. H., Jessell, T. M., Siegelbaum, S. A., & Hudspeth, A. J. (2012). *Principles of Neural Science* (5th ed.). New York: McGraw-Hill.

NeuroImage Vol. 62, Issue 2 (2012): 20 Years of fMRI. https://www.sciencedirect.com/journal/neuroimage/vol/62/issue/2

Poldrack, R. A., Nichols, T., & Mumford, J. (2011). *Handbook of Functional MRI Data Analysis*. Cambridge: Cambridge University Press.

*Rieke, F., Warland, D., de Ruyter van Steveninck, R., & Bialek, W. (1999). *Spikes: Exploring the Neural Code*. Cambridge: MIT Press.

SCHEDULE OF READINGS

8/25 Mechanisms: Definitions and Discovery

Required:

Machamer, P., Darden, L., & Craver, C. F. (2000). Thinking about mechanisms. *Philosophy of Science*, *67*, 1–25. https://doi.org/10.1086/392759

Craver, C. F., & Darden, L. (2006/2001). Discovering mechanisms in neurobiology: The case of spatial memory. In L. Darden, *Reasoning in Biological Discoveries* (pp. 40–64). Cambridge: Cambridge University Press.

Supplementary:

Woodward, J. (2002). What is a mechanism? A counterfactual account. *Philosophy of Science*, *69*, 366–378. https://doi.org/10.1086/341859

Bechtel, W. (2009). Looking down, around, and up: Mechanistic explanation in psychology. *Philosophical Psychology*, 22(5), 543–564. https://doi.org/10.1080/09515080903238948

Kastner, L., & Haueis, P. (2019). Discovering patterns: On the norms of mechanistic inquiry. *Erkenntnis*. https://doi.org/10.1007/s10670-019-00174-7

9/1 Mechanisms: Levels and Reduction

Required:

Craver, C. F. (2015). Levels. In T. Metzinger & J. M. Windt (Eds). *Open MIND*: 8(T). Frankfurt am Main: MIND Group. https://doi.org/10.15502/9783958570498

Bechtel, W. (2008). Reduction and independence of higher-level sciences: A rapprochement. In *Mental Mechanisms: Philosophical Perspectives on Cognitive Neuroscience* (pp. 129–158). New York: Routledge.

Supplementary:

Sullivan, J. A. (2008). The multiplicity of experimental protocols: A challenge to reductionist and non-reductionist models of the unity of neuroscience. *Synthese*, *167(3)*, 511–539. https://doi.org/10.1007/s11229-008-9389-4

Bickle, J. (2006). Reducing mind to molecular pathways: Explicating the reductionism implicit in current cellular and molecular neuroscience. *Synthese*, 151(3), 411–434. https://doi.org/10.1007/s11229-006-9015-2

Bechtel, W. (2017). Explicating Top-Down Causation Using Networks and Dynamics. *Philosophy of Science*, *84*(2), 253–274. https://doi.org/10.1086/690718

Potochnik, A., & McGill, B. (2012). The Limitations of Hierarchical Organization. *Philosophy of Science*, *79*(1), 120–140. https://doi.org/10.1086/663237

9/8 Dynamical Modeling

Required:

Kaplan, D. M., & Craver, C. F. (2011). The Explanatory Force of Dynamical and Mathematical Models in Neuroscience: A Mechanistic Perspective. *Philosophy of Science*, 78(Oct.), 601–627.

Ross, L. N. (2015). Dynamical Models and Explanation in Neuroscience. *Philosophy of Science*, *82(1)*, 32–54. https://doi.org/10.1086/679038

Supplementary:

Barack, D. L. (2020). Mental kinematics: Dynamics and mechanics of neurocognitive systems. *Synthese*. https://doi.org/10.1007/s11229-020-02766-1

Zednik, C. (2011). The Nature of Dynamical Explanation. *Philosophy of Science*, 78(2), 238–263. https://doi.org/10.1086/659221

Meyer, R. (2020). Dynamical Causes. Biology and Philosophy, Forthcoming.

9/15 Network Modeling

Required:

Rathkopf, C. (2018). Network representation and complex systems. *Synthese*, 195(1), 55–78. https://doi.org/10.1007/s11229-015-0726-0

Kostic, D. (2018). The topological realization. *Synthese*, *195*, 79–98. https://doi.org/10.1007/s11229-016-1248-0

Supplementary:

Bassett, D. S., & Sporns, O. (2017). Network neuroscience. *Nature Neuroscience*, 20(3), 353–364. https://doi.org/10.1038/nn.4502

Craver, C. F. (2015). The Explanatory Power of Network Models. *Philosophy of Science*, 83(December), 698–709.

Ross, L. N. (2020). Distinguishing topological and causal explanation. *Synthese*. https://doi.org/10.1007/s11229-020-02685-1

Zednik, C. (2019). Models and mechanisms in network neuroscience. *Philosophical Psychology*, 32(1), 23–51. https://doi.org/10.1080/09515089.2018.1512090

Woodward, J. (2013). Mechanistic Explanation: Its Scope and Limits. *Aristotelian Society Supplementary Volume*, *87*(1), 39–65. https://doi.org/10.1111/j.1467-8349.2013.00219.x

9/22 Neuroimaging: Images, Inference, Evidence

Required:

Roskies, A. L. (2010). Neuroimaging and inferential distance: The perils of pictures. In Stephen José Hanson and Martin Bunzl (Eds.), *Foundational Issues in Human Brain Mapping* (pp. 195-215). Cambridge: MIT Press.

Klein, C. (2010). Images are not the evidence in neuroimaging. *The British Journal for the Philosophy of Science*, 61(2), 265–278.

Supplementary:

Wright, J. (2018). The Analysis of Data and the Evidential Scope of Neuroimaging Results. *British Journal of the Philosophy of Science*, *69*(4), 1179–1203. doi: 10.1093/bjps/axx012

Bogen, J. (2002). Epistemological Custard Pies from Functional Brain Imaging. *Philosophy of Science*, 69(S3), S59–S71. https://doi.org/10.1086/341768

de Rijcke, Sarah and Anne Beaulieu. (2014). Networked neuroscience: Brain scans and visual knowing at the intersection of atlases and databases, In Catelijne Coopmans, Mike Lynch, Janet Vertesi & Steve Woolgar (Eds.). Representations in Scientific Practice Revisited. Cambridge: MIT Press.

Poldrack, R. A., Baker, C. I., Durnez, J., Gorgolewski, K. J., Matthews, P. M., Munafò, M. R., Nichols, T. E., Poline, J.-B., Vul, E., & Yarkoni, T. (2017).

Scanning the horizon: Towards transparent and reproducible neuroimaging research. *Nature Reviews Neuroscience*, *18*(2), 115–126. https://doi.org/10.1038/nrn.2016.167

9/29 Neuroimaging: Reverse Inference

Required:

Coltheart, M. (2006). What has functional neuroimaging told us about the mind (so far)? *Cortex*, *42*, 323–331.

Poldrack, R. A. (2006). Can cognitive processes be inferred from neuroimaging data? *Trends in Cognitive Sciences*, *10*(2), 59–63. https://doi.org/10.1016/j.tics.2005.12.004

Machery, E. (2014). In Defense of Reverse Inference. *The British Journal for the Philosophy of Science*, 65(2), 251–267. https://doi.org/10.1093/bjps/axs044

Supplementary:

Roskies, A. (2009). Brain-Mind and Structure-Function Relationships: A Methodological Response to Coltheart. *Philosophy of Science, 76*(December), 1–14. https://doi.org/10.1086/605815

Henson, R. (2006). Forward inference using functional neuroimaging: Dissociations versus associations. *Trends in Cognitive Sciences*, *10*(2), 64–69. https://doi.org/10.1016/j.tics.2005.12.005

Glymour, C., & Hanson, C. (2016). Reverse Inference in Neuropsychology. *The British Journal for the Philosophy of Science*, *67*(4), 1139–1153. https://doi.org/10.1093/bjps/axv019

Aktunc, M. E. (2014). Severe Tests in Neuroimaging: What We Can Learn and How We Can Learn It. *Philosophy of Science*, *81*(5), 961–973. https://doi.org/10.1086/677691

Nathan, M. J., & Del Pinal, G. (2017). The Future of Cognitive Neuroscience? Reverse Inference in Focus. *Philosophy Compass*, *12*(7), 1–11. https://doi.org/10.1111/phc3.12427

10/6 Neuropsychology: Cases, Lesions, and Dissociations

Required:

Shallice, T. (2015). Cognitive neuropsychology and its vicissitudes: The fate of Caramazza's axioms. *Cognitive Neuropsychology*, *3*2(7–8), 385–411.

Davies, M. (2010). Double Dissociation: Understanding its Role in Cognitive Neuropsychology. *Mind & Language*, *25*(5), 500–540.

Supplementary:

Caramazza, A. (1986). On drawing inferences about the structure of normal cognitive systems from the analysis of patterns of impaired performance: The case for single-patient studies. *Brain and Cognition*, *5*(1), 41–66.

Van Orden, G.C., Pennington, B.F. and Stone, G.O. (2001), What do double dissociations prove?. *Cognitive Science*, *25*, 111-172. https://doi.org/10.1207/s15516709cog2501_5

Glymour, C. (1994). On the Methods of Cognitive Neuropsychology. *The British Journal for the Philosophy of Science*, *45*(3), 815–835.

Cortex, Vol 39, Issue 1 (2003): Special issue on double dissociation. https://www.sciencedirect.com/journal/cortex/vol/39/issue/1

10/13 Function and Localization

Required:

Price, C. J., & Friston, K. J. (2005). Functional ontologies for cognition: The systematic definition of structure and function. *Cognitive Neuropsychology*, 22(3), 262–275. https://doi.org/10.1080/02643290442000095

Klein, C. (2012). Cognitive Ontology and Region- versus Network-Oriented Analyses. *Philosophy of Science* 79(5): 952–60. https://doi.org/10.1086/667843

Supplementary:

Anderson, M. L. (2010). Neural reuse: A fundamental organizational principle of the brain. *The Behavioral and Brain Sciences*, 33(4), 245–266; discussion 266-313. https://doi.org/10.1017/S0140525X10000853

McCaffrey, J. B. (2015). The Brain's Heterogeneous Functional Landscape. *Philosophy of Science*, *82*(5), 1010–1022. https://doi.org/10.1086/683436

Burnston, D. C. (2016). A contextualist approach to functional localization in the brain. *Biology and Philosophy, 31*, 527–550. https://doi.org/10.1007/s10539-016-9526-2

Hutto, D. D., Peeters, A., & Segundo-Ortin, M. (2017). Cognitive ontology in flux: The possibility of protean brains. *Philosophical Explorations*, *20*(2), 209–223. https://doi.org/10.1080/13869795.2017.1312502

Klein, C. (2017). Brain regions as difference-makers. *Philosophical Psychology*, 30(1–2), 1–20. https://doi.org/10.1080/09515089.2016.1253053

Bergeron, V. (2007). Anatomical and Functional Modularity in Cognitive Science: Shifting the Focus. *Philosophical Psychology*, *20*(2), 175–195. https://doi.org/10.1080/09515080701197155

10/20 Intervention and Control

Required:

Robins, S. K. (2018). Memory and Optogenetic Intervention: Separating the Engram from the Ecphory. *Philosophy of Science*, *85*(5), 1078–1089. https://doi.org/10.1086/699692

Sullivan, J. A. (2018). Optogenetics, Pluralism, and Progress. *Philosophy of Science*, *85*(5), 1090–1101. https://doi.org/10.1086/699724

Supplementary:

Bickle, J. (2018). From Microscopes to Optogenetics: Ian Hacking Vindicated. *Philosophy of Science*, *85*(5), 1065–1077. https://doi.org/10.1086/699760

Bickle, J., & Kostko, A. (2018). Connection experiments in neurobiology. *Synthese*, *195*(12), 5271–5295. https://doi.org/10.1007/s11229-018-1838-0

10/27 Neural Computation

Required:

Piccinini, G., & Bahar, S. (2013). Neural computation and the computational theory of cognition. *Cognitive Science*, *37*(3), 453–488. https://doi.org/10.1111/cogs.12012

Chirimuuta, M. (2018). Explanation in Computational Neuroscience: Causal and Non-causal. *The British Journal for the Philosophy of Science*, *69*(3), 849–880. https://doi.org/10.1093/bjps/axw034

Supplementary:

Kriegeskorte, N., & Douglas, P. K. (2018). Cognitive computational neuroscience. *Nature Neuroscience*, *21*(9), 1148–1160. https://doi.org/10.1038/s41593-018-0210-5

Egan, F. (2017). Function-theoretic explanation and the search for neural mechanisms. In David M. Kaplan (Ed.), *Explanation and Integration in Mind and Brain Science* (pp. 145–163). Oxford: Oxford University Press.

Boone, W., & Piccinini, G. (2016). The cognitive neuroscience revolution. *Synthese*, *193*(5), 1509–1534. https://doi.org/10.1007/s11229-015-0783-4

11/3 Deep Neural Networks and Neural Simulation

Required:

Kriegeskorte, N. (2015). Deep Neural Networks: A New Framework for Modeling Biological Vision and Brain Information Processing. *Annual Review of Vision Science*, *1*(1), 417–446. doi: 10.1146/annurev-vision-082114-035447

Buckner, C. (2018). Empiricism without magic: Transformational abstraction in deep convolutional neural networks. *Synthese*, *195*(12), 5339–5372. doi: 10.1007/s11229-018-01949-1

Supplementary:

Sinz, F. H., Pitkow, X., Reimer, J., Bethge, M., & Tolias, A. S. (2019). Engineering a less artificial intelligence. *Neuron*, *103*(6), 967–979. https://doi.org/10.1016/j.neuron.2019.08.034

Eliasmith, C., & Trujillo, O. (2014). The use and abuse of large-scale brain models. *Current Opinion in Neurobiology*, *25*, 1–6. doi: 10.1016/j.conb.2013.09.009

Serban, M. (2017). Learning from large-scale neural simulations. In *Progress in Brain Research* (Vol. 233, pp. 129–148). doi: 10.1016/bs.pbr.2017.05.004

Fan, X., & Markram, H. (2019). A Brief History of Simulation Neuroscience. *Frontiers in Neuroinformatics*, 13, 32. doi: 10.3389/fninf.2019.00032

Buckner, C. (2019). Deep learning: A philosophical introduction. *Philosophy Compass*, 14(10). https://doi.org/10.1111/phc3.12625

11/10 Predictive Coding

Required:

Clark, A. (2013). Whatever next? Predictive brains, situated agents, and the future of cognitive science. *The Behavioral and Brain Sciences*, *36*(3), 181–204. https://doi.org/10.1017/S0140525X12000477

Sun, Z., & Firestone, C. (2020). The Dark Room Problem. *Trends in Cognitive Sciences*, 24(5), 346–348. https://doi.org/10.1016/j.tics.2020.02.006

Supplementary:

Williams, D. (2020). Predictive coding and thought. *Synthese*, *197*(4), 1749–1775. https://doi.org/10.1007/s11229-018-1768-x

Friston, K. J., & Stephan, K. E. (2007). Free-energy and the brain. *Synthese*, 159(3), 417–458. https://doi.org/10.1007/s11229-007-9237-v

11/17 Predictive vs. Explanatory Investigations

Required:

Bzdok, D., & Ioannidis, J. P. A. (2019). Exploration, Inference, and Prediction in Neuroscience and Biomedicine. *Trends in Neurosciences*, *42*(4), 251–262. https://doi.org/10.1016/j.tins.2019.02.001

Yarkoni, T., & Westfall, J. (2017). Choosing Prediction Over Explanation in Psychology: Lessons From Machine Learning. *Perspectives on Psychological Science*, *12*(6), 1100–1122. https://doi.org/10.1177/1745691617693393

Chirimuuta, M. (2020). Prediction versus understanding in computationally enhanced neuroscience. *Synthese*. https://doi.org/10.1007/s11229-020-02713-0

Supplementary:

Weiskopf, D. A. (2020). Data mining the brain to decode the mind. In F. Calzavarini & M. Viola (Eds.), *Neural Mechanisms*. Springer.

Douglas, H. E. (2009). Reintroducing Prediction to Explanation. *Philosophy of Science*, 76(4), 444–463. https://doi.org/10.1086/648111

Woo, C.-W., Chang, L. J., Lindquist, M. A., & Wager, T. D. (2017). Building better biomarkers: Brain models in translational neuroimaging. Nature Neuroscience, 20(3), 365–377. https://doi.org/10.1038/nn.4478

11/23-11/28 Fall Break; No classes

12/1 Diversity and Culture in Neuroscience

Required:

Han, S., & Ma, Y. (2015). A Culture–Behavior–Brain Loop Model of Human Development. *Trends in Cognitive Sciences, 19*(11), 666–676. https://doi.org/10.1016/j.tics.2015.08.010

Sasaki, J. Y., & Kim, H. S. (2017). Nature, Nurture, and Their Interplay: A Review of Cultural Neuroscience. *Journal of Cross-Cultural Psychology, 48*(1), 4–22. https://doi.org/10.1177/0022022116680481

Supplementary:

Dotson, V. M., & Duarte, A. (2020). The importance of diversity in cognitive neuroscience. *Annals of the New York Academy of Sciences, 1464*(1), 181–191. https://doi.org/10.1111/nyas.14268

Falk, E. B., Hyde, L. W., Mitchell, C., Faul, J., Gonzalez, R., Heitzeg, M. M., Keating, D. P., Langa, K. M., Martz, M. E., Maslowsky, J., Morrison, F. J., Noll, D. C., Patrick, M. E., Pfeffer, F. T., Reuter-Lorenz, P. A., Thomason, M. E., Davis-Kean, P., Monk, C. S., & Schulenberg, J. (2013). What is a representative brain? Neuroscience meets population science. *Proceedings of the National Academy of Sciences*, 110(44), 17615–17622. https://doi.org/10.1073/pnas.1310134110

Dubois, J., & Adolphs, R. (2016). Building a Science of Individual Differences from fMRI. *Trends in Cognitive Sciences*, *20*(6), 425–443. https://doi.org/10.1016/j.tics.2016.03.014

Ward, Z. B. (2019). Registration Pluralism and the Cartographic Approach to Data Aggregation across Brains. *The British Journal for the Philosophy of Science*, axz027. https://doi.org/10.1093/bjps/axz027

Department of Philosophy General Syllabus Statement Fall 2020

- This syllabus provides a general plan for the course. Deviations may be necessary.
- The withdrawal period begins via PAWS, Wednesday, September 2nd -Tuesday, October 13th. The midpoint to receive a W is Tuesday, October 13th. A student may be awarded a grade of "W" no more than 6 times in their careers at Georgia State. After 6 W's, a withdrawal is recorded as a WF on the student's record. A WF counts as an F in a GPA. Please view the calendar for more dates and information.
- The customary penalty for any violation of the academic honesty rules is an "F" in the course, which cannot be replaced by repeating the course. See selections from the University Policy on Academic Honesty on the reverse of this sheet. Copying or using any material from the internet without proper citation is a violation of the academic honesty rules.
- Students who wish to request an accommodation for a disability must do so by registering with
 the Access and Accommodations Center (AACE) located in Student Center East, Suite 205.
 Students may only be accommodated upon issuance of a signed Student Accommodation Letter
 through the AACE. The signed Student Accommodation Letter may be submitted electronically
 to the course instructor or hand delivered by the student to all classes in which the student is
 seeking accommodations.
- Students are responsible for confirming that they are attending the course section for which
 they are registered. Failure to do so may result in an F for the course.
- By University policy and to respect the confidentiality of all students, final grades may not be posted or given out over the phone. To see your grades, use PAWS.
- Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State University. Upon completing the course, please take the time to fill out the online course evaluation.

Subscribe to one of our department listservs for current information and events:

- 1. Undergraduate Students:
 - http://philosophy.gsu.edu/undergraduate/listserv
- 2. Graduate Students: http://philosophy.gsu.edu/graduate/listserv

For more information on the philosophy program and the value of philosophy courses visits http://philosophy.gsu.edu

Policy on Academic Honesty, from the GSU Catalog

As members of the academic community, students are expected to recognize and uphold standards of intellectual and academic integrity. The university assumes as a basic and minimum standard of conduct in academic matters that students be honest and that they submit for credit only the products of their own efforts. Both the ideals of scholarship and the need for fairness require that all dishonest work be rejected as a basis for academic credit. They also require that students refrain from any and all forms of dishonorable or unethical conduct related to their academic work.

The university's policy on academic honesty is published in the *Faculty Handbook* and *On Campus: The Student Handbook* and is available to all members of the university community. The policy represents a core value of the university, and all members of the university community are responsible for abiding by its tenets. <u>Lack of knowledge of this policy is not an acceptable defense to any charge of academic dishonesty</u>. All members of the academic community—students, faculty, and staff—are expected to report violations of these standards of academic conduct to the appropriate authorities. The procedures for such reporting are on file in the offices of the deans of each college, the office of the dean of students, and the office of the provost.

Definitions and Examples

The examples and definitions given below are intended to clarify the standards by which academic honesty and academically honorable conduct are to be judged. The list is merely illustrative of the kinds of infractions that may occur, and it is not intended to be exhaustive. Moreover, the definitions and examples suggest conditions under which unacceptable behavior of the indicated types normally occurs; however, there may be unusual cases that fall outside these conditions that also will be judged unacceptable by the academic community.

Plagiarism: Plagiarism is presenting another person's work as one's own. <u>Plagiarism includes any para-phrasing or summarizing of the works of another person without acknowledgment</u>, including the submitting of another student's work as one's own. Plagiarism frequently involves a failure to acknowledge in the text, notes, or footnotes the quotation of the paragraphs, sentences, or even a few phrases written or spoken by someone else. The submission of research or completed papers or projects by someone else is plagiarism, as is the unacknowledged use of research sources gathered by someone else when that use is specifically forbidden by the faculty member. Failure to indicate the extent and nature of one's reliance on other sources is also a form of plagiarism. Any work, in whole or in part, taken from the Internet or other computer-based resource without properly referencing the source (for example, the URL) is considered plagiarism. A complete reference is required in order that all parties may locate and view the original source. Finally, there may be forms of plagiarism that are unique to an individual discipline or course, examples of which should be provided in advance by the faculty member. The student is responsible for understanding the legitimate use of sources, the appropriate ways of acknowledging academic, scholarly or creative indebtedness, and the consequences of violating this responsibility.

Multiple Submissions: It is a violation of academic honesty to submit substantial portions of the same work for credit more than once without the explicit consent of the faculty member(s) to whom the material is submitted for additional credit. In cases in which there is a natural

development of research or knowledge in a sequence of courses, use of prior work may be desirable, even required; however, the student is responsible for indicating in writing, as a part of such use, that the current work submitted for credit is cumulative in nature.

Cheating on Examinations: Cheating on examinations involves giving or receiving unauthorized help before, during, or after an examination. Examples of unauthorized help include the use of notes, computer-based resources, texts, or "crib sheets" during an examination (unless specifically approved by the faculty member), or sharing information with another student during an examination (unless specifically approved by the faculty member). Other examples include intentionally allowing another student to view one's own examination and collaboration before or after an examination if such collaboration is specifically forbidden by the faculty member.

Unauthorized Collaboration: Submission for academic credit of a work product, or a part thereof, represented as its being one's own effort, which has been developed in substantial collaboration with another person or source or with a computer-based resource is a violation of academic honesty. It is also a violation of academic honesty knowingly to provide such assistance. Collaborative work specifically authorized by a faculty member is allowed.

Falsification: It is a violation of academic honesty to misrepresent material or fabricate information in an academic exercise, assignment or proceeding (e.g., false or misleading citation of sources, falsification of the results of experiments or computer data, false or misleading information in an academic context in order to gain an unfair advantage).