Syllabus

NEUR 689 | BIOL 691 | BINF 739 | NEUR 461

Computational Social Neuroscience

Fall Semester 2022

Weekly schedule: Each week runs from Monday (12:01 am) to Sunday (11:59 pm) starting Aug. 22, 2022.

Instructor: Frank Krueger, Ph.D.
Department: School of Systems Biology
Phone: 703-993-4358
E-mail: fkrueger@gmu.edu (preferred)
Office Hours: By appointment (via Blackboard Collaborate Ultra or Zoom)

Course Description

Computational social neuroscience is an **asynchronous online course** exploring how psychoneurobiological systems implement social processes and behaviors. This introductory course aims to provide a broad overview of the social concepts, methodologies, and computational methods to inform and refine theories of social processes and behaviors.

- **Part 1** provides an overview of the evolutionary origins of social intelligence and the psychoneurobiological signatures of processes that drive social cognition and behavior (e.g., reading faces and bodies; understanding and interacting with others; social relationships and groups; morality and antisocial behavior).
- **Part 2** deals with the fundamental social neuroscience tools used to study human and non-human social processes and behavior, including functional neuroimaging, electrophysiological, lesion, hormonal, and genetic approaches.
- **Part 3** covers computational modeling for explaining social processes and relating them to neural activity and behavior, including approaches for modeling neural mechanisms of social processes, multivariate neural response pattern analyses at varying spatial scales, and time-varying connectivity patterns between regions of the social brain.

By learning about social concepts, methodologies, and computational methods, students will gain insights into how people create, understand, and navigate their complex social environments being the focus of the interdisciplinary field of computational social neuroscience.

Learning outcomes

By the end of this course, students will be able to:

1. Evaluate the fundamental social neuroscience tools used to study human and non-human social processes and behavior;
2. Understand the evolutionary origins of social intelligence and the psychoneurobiological signatures of processes that enable social cognition and behavior; and
3. Employ computational modeling for explaining social processes and relating them to neural activity social cognition and behavior.

Prerequisite

Prerequisites are the completion or concurrent enrollment in all other required general education courses or permission of the instructor. This course is essential for anyone interested in the rapidly developing field of computational social neuroscience. Reading, research and construction projects, and collaboration with the class are major components of the course. Tasks to be completed for this course will be adjusted for students currently involved either in a undergraduate or graduate program.

Textbook & Course Materials

Required Text

- Ward J. The Student's Guide to Social Neuroscience. Psychology Press.

Recommended Texts & Other Readings

- Other readings will be made available in Blackboard, especially for the computational neuroscience part related to this course (See Learning Modules).

Course Logistics

This course will use a distance learning format; the primary meeting space will be on Blackboard 9.1; and we will use other means of keeping in touch such as e-mail, telephone, and Blackboard Collaborate Ultra/ Zoom. This is a rigorous course: you will accomplish the following activities in a typical week:

- reading about 35-50 pages, reflecting the content, and discussing the material with your classmates;
- completing online activities and responding to weekly requirements; and
- working on assignments completing in Blackboard according to the assignment schedule.

Though the delivery method is different, it should take you the same amount of time as a typical full-semester course. You should **expect to spend approximately 9 hours on coursework each week** (including the time you would have spent in a classroom). It is critical to keep up with weekly requirements. Each week, I will provide announcements via e-mail and a module in our Blackboard course to specify required activities and assignments (available by clicking on 'Weekly Modules' on the course menu in Blackboard).

Blackboard (Available on Aug. 22, 2022)

We will use Blackboard 9.1 for the course. Additional guidance on individual assignments and discussion questions will be posted there. All assignments will be submitted through Blackboard for grading. Please visit our Blackboard site regularly.

Access Blackboard 9.1 by following these steps:

1. Go to http://mymason.gmu.edu.
2. Login using your NETID and password.
3. Click on the 'Courses' tab.
4. Click on 'Neurobiology of Decision-Making (NEUR 592| BIOL 691| BINF 739 (Fall 2022)' under the 'Course List' heading.

Instructor-Student Communication

I will respond to your e-mails from Monday (9 am) through Friday (6 pm) within 24 hours. If I am away from e-mail for more than two days, I will send an announcement to the class.

Before sending an e-mail with questions, please check the following (available on your Blackboard course menu) **unless the e-mail is of a personal nature**:

1. Syllabus.
2. Ask the Professor (Feel free to respond to other students in the Help forum if you know the answer.).
3. Blackboard Tutorials on how to use Blackboard features.
4. Blackboard Q&A (resources specific to Mason).
5. Technology Requirements.

Mason E-MAIL

- Mason requires that Mason e-mail be used for all courses. I will be sending messages to your Mason e-mail, and you are responsible for ensuring you have access to these messages.
- You may forward your Mason e-mail to other accounts but always use your Mason e-mail when communicating with me to verify your identity.
- You must check your Mason e-mail account regularly and keep your mailbox maintained so that messages are not rejected for being over quota.
- When you e-mail me, you can expect a response within 24 hours (*Monday through Friday*). If I am going to be away from e-mail for more than two days, I will send an announcement to the class.
- When you e-mail me, be sure to include '**CSN Course'** at the beginning of the subject heading to alert me that I have received a message from one of my online students.

Participation

Netiquette For Online Discussions

Our discussion should be collaborative, not combative; you are creating a learning environment, sharing information, and learning from one another. Respectful communication is essential to your success in this course and as a professional. Please re-read your responses carefully before you post them so others will not take them out of context or as personal attacks. Be positive to others and diplomatic with your words, and I will try my best to do the same. Be careful when using sarcasm and humor. Without face-to-face communication, your joke may be viewed as criticism. Experience shows that even an innocent remark in the online environment can be easily misconstrued.

Netiquette prepared by Charlene Douglas, Associate Professor, College of Health & Human Services, GMU.

Technology Requirements

Technology requirements for the course are:

- Internet connection (DSL, LAN, or cable connection desirable).
- Supported Web browser (e.g., Internet Explorer, Chrome, Safari) to use Adobe Connect for Live Class Sessions.
- MS Office 365 ProPlus is provided at no cost via the Microsoft Student Advantage Program (Access is tied to your @gmu.edu e-mail address).

Student Responsibilities

Mason E-mail

Students are responsible for the content of university communications sent to their George Mason University e-mail account and are required to activate their account and check it regularly. For accessibility and privacy, the university, school, and program will send communications to students solely through their Mason e-mail account —students should respond accordingly.

Patriot Pass

Once you sign up for your Patriot Pass, your passwords will be synchronized, and you will use your Patriot Pass username and password to log in to the following systems: Blackboard, University Libraries, Mason E-Mail, myMason, Patriot Web, Virtual Computing Lab, and WEMS. [See https://password.gmu.edu/index.jsp].

Students with Disabilities

Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester (See Office of Disability Services).

Academic Integrity

Students must be responsible for their work, and students and faculty must take on the responsibility of dealing explicitly with violations. The tenet must be the foundation of our university culture. [See https://oai.gmu.edu/].

Honor Code and Virtual Classroom Conduct

Students must adhere to the guidelines of the George Mason University Honor Code (See Honor Code).

We value critical thinking, and therefore, students must read the assigned material (e.g., books, articles) before the class with a critical eye. Active thought, quality of inputs, and a conflict resolution attitude should be your guiding principles.

The principle of academic integrity is taken very seriously, and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form.

Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind), please ask for guidance and clarification.

Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please contact me.

University Policies

Students must follow university policies [See University Policies].

Responsible Use of Computing

Students must follow the university policy for Responsible Use of Computing [See http://universitypolicy.gmu.edu/policies/responsible-use-of-computing].

University Calendar

Details regarding the current Academic Calendar [See https://registrar.gmu.edu/calendars/].

University Catalog

The current university catalog [See University Catalog].

Student Services

Writing Center

The George Mason University Writing Center staff provides various resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing (See Writing Center). ESL Help: The program was designed specifically for students whose first language is not English who feel they might benefit from additional, targeted support throughout an entire semester (See Writing Center).

University Libraries

University Libraries provide resources for distance students. (See http://library.gmu.edu/for/online).

Counseling and Psychological Services

The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops, and outreach programs) to enhance students' personal experience and academic performance [See http://caps.gmu.edu].

Family Educational Rights and Privacy Act (FERPA)

The Family Educational Rights and Privacy Act of 1974 (FERPA), also known as the 'Buckley Amendment,' is a federal law that gives protection to student educational records and provides students with certain rights. [See http://registrar.gmu.edu/privacy].

Weekly Schedule

Distance learning courses are dynamic—to ensure we achieve our learning outcomes— we may need to negotiate weekly schedule changes. We will focus on learning, fairness, and reason for any approved changes. Each week's activities —reading assignments about topics, watching videos, and reflecting on neuroscience methods (via a blog), defining key concepts (via a glossary), testing your knowledge about brain anatomy (via a quiz), and sharing and discussing your knowledge with classmates (via discussion forum)— **require approximately 9 hours.**

The table below lists the weekly schedule, significant activities, significant assignments, points, and due dates for this course. Final grades will be based on the total number of points earned in the class.

Weeks	Major Topics and Method	Assignments (graded)	Points	Due Dates (11.59 pm, EST)
Week 1 Monday, Aug. 22 - Sunday, Aug. 28	I. SOCIAL NEUROSCIENCE Topic: Introduction to social neuroscience Method: Single-Unit Recording	Orientation Quiz Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 5 10 10 5 10	Sunday, 8/28 Thursday, 8/25 Sunday, 8/28
Week 2 Monday, Aug. 29 - Sunday, Sept. 4	I. SOCIAL NEUROSCIENCE Topic: Evolutionary origins of social intelligence and culture Method: Electroencephalography (EEG)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 9/2 Sunday, 9/4
Week 3 Monday, Sept. 5 - Sunday, Sept. 11	I. SOCIAL NEUROSCIENCE Topic: Emotion and motivation Method: Event-Related Potential (ERP)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 9/8 Sunday, 9/11
Week 4 Monday, Sept. 12 - Sunday, Sept. 18	I. SOCIAL NEUROSCIENCE Topic: Reading faces and bodies Method: Magnetoencephalography (MEG)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 9/15 Sunday, 9/18
Week 5 Monday, Sept. 19 - Sunday, Sept. 25	I. SOCIAL NEUROSCIENCE Topic: Understanding others Method: Positron Emission Tomography (PET)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 9/22 Sunday, 9/25
Week 6 Monday, Sept. 26 - Sunday, Oct. 2	I. SOCIAL NEUROSCIENCE Topic: Interacting with others Method: Magnetic Resonance Imaging (MRI)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 9/29 Sunday, 10/2

Week 7 Monday, Oct. 3 - Sunday, Oct. 9	I. SOCIAL NEUROSCIENCE Topic: Relationships Method: Functional Magnetic Resonance Imaging (fMRI)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 10/6 Sunday, 10/9
Week 8 Monday, Oct. 10 - Sunday, Oct. 16	I. SOCIAL NEUROSCIENCE Topic: Groups and identity Method: Resting-State fMRI (RS-fMRI)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 10/13 Sunday, 10/16
Week 9 Monday, Oct. 17 - Sunday, Oct. 23	I. SOCIAL NEUROSCIENCE Topic: Morality and antisocial behavior Method: Functional Near-Infrared Spectroscopy (fNIRS)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 10/20 Sunday, 10/23
Week 10 Monday, Oct. 24 - Sunday, Oct. 30	I. SOCIAL NEUROSCIENCE Topic: Developmental social neuroscience Method: Lesion Studies (Humans)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 10/25 Sunday, 10/30
Week 11 Monday, Oct. 31 - Sunday, Nov. 6	II. COMPUTATIONAL SOCIAL NEUROSCIENCE Topic: Reinforcement learning Method: Invasive Stimulation Method in Animals (Microstimulation)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 11/3 Sunday, 11/6
Week 12 Monday, Nov. 7 - Sunday, Nov. 13	II. COMPUTATIONAL SOCIAL NEUROSCIENCE Topic: Functional Connectivity Method: Transcranial Magnetic Stimulation (TMS)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 11/10 Sunday, 11/13
Week 13 Monday, Nov. 14 - Sunday, Nov. 20	II. COMPUTATIONAL SOCIAL NEUROSCIENCE Topic: Multivariate Pattern Decoding Method: Transcranial Direct Current Stimulation (tDCS)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection	5 10 10 5 10	Thursday, 11/17 Sunday, 11/20

Monday, Nov. 21 - Sunday, Nov. 27	Thanksgiving Recess			
Week 14 Monday, Nov. 28 - Sunday, Dec. 4	II. COMPUTATIONAL SOCIAL NEUROSCIENCE Topic: Coordinate-based Meta-Analysis Method: Low-Intensity Focused Ultrasound (LIFU)	Topic: Discussion (Part 1) Topic: Quiz Brain: Quiz Topic: Discussion (Part 2) Method: Reflection Course Evaluation	5 10 10 5 10 15	Thursday, 12/1 Sunday, 12/4
Exam Week Monday, Dec. 5 - Sunday, Dec. 11	Research Grant Proposal	Submission: Proposal	170	Sunday, 12/11
			Total 700	

Grading Scale (points)

Final grades assigned for this course will be based on the percentage of total points earned and are assigned as follows:

Letter Grade	Percentage	Points	Performance
A^+	98-100%	686-700	Superb Work
A	93-97%	651-679	Excellent Work
A^-	90-92%	630-644	Nearly Excellent Work
B^+	87-89%	609-623	Very Good Work
B	83-86%	581-602	Good Work
B^-	80-82%	560-574	Mostly Good Work
N/A	<80%	<560	Failing Work