ECO 422 H1S L0101:
Special Topics in Economics: Biology, Genetics & Economics

Department of Economics, University of Toronto

Instructor: Prof. Jonathan Beauchamp
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Lectures: Wednesday 9:00am – 11:00am, LA341
Office hours: Wednesday 11:00am – 11:45am (drop-in), GE306
Wednesday 11:45am – 12:30am (by appointment), GE306

TA (tutorials): Maripier Isabelle
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Tutorials: Friday 2:00pm – 3:00pm, LA341

Course Description

The course introduces and critically assesses economic research that uses genetic, neuroscientific, and other biosocial data. We will address questions such as: What are the effects of brain neurochemistry on economic decision-making? What role do nature and nurture play in economic behaviour and outcomes? Are some genetic variants associated with economic preferences and outcomes? And what are the policy implications (or lack thereof) of related findings?

Previous Training

Prerequisites: (i) ECO200Y1/ECO204Y1/ECO206Y1
(ii) ECO220Y1/ECO227Y1/(STA220H1, STA255H1)/(STA257H1, STA261H1)
(iii) At least one FCE in ECO at the 300 level or higher
Recommended: ECO375H1

The course will involve thorough discussions of empirical papers. You should thus have a good understanding of linear regressions, omitted variable bias, and other introductory-level econometrics concepts. Some key econometrics concepts will be reviewed in the first few tutorials.

Course Website

The course website on **Blackboard** is accessible through https://portal.utoronto.ca.
Lecture slides will be posted on the Blackboard site. The Blackboard site will also be used to distribute assignments, manage class communications, etc.

Evaluation

Task	Weight	Due date
Midterm	30 %	March 15, 2017
Four written assignments (only the three best grades will count)	60% (20% for each of the three best grades)	January 31, 2017 February 14, 2017 March 7, 2017 April 4, 2017
Class participation and attendance	10 %	N/A

The **midterm** will be held on Wednesday March 15 from 9am to 11am in room LA341 (during class time).

- The midterm will have 120 minutes' duration.
- Students who do not write the test will be given a grade of zero, unless I receive:
  (1) an email from the student to indicate that they will not be able to write the midterm, on the day of the midterm, and
  (2) an appropriate medical note explaining why the test was missed, to be provided before the scheduled make-up midterm.
  - The medical note must be provided using the University of Toronto medical certificate; only original notes will be accepted (I will not accept photocopies or emailed certificates); no other documentation will be accepted.
  - The note must be completed by a Medical Doctor and must clearly indicate the doctor's OHIP registration number.
  - The note must clearly state that on the date of the test, the student was too sick to write the test. Illness before the test is not sufficient grounds for missing the test. Nor will I accept notes that indicate that the student would have performed "sub-optimally."
  - To comply with these requirements, it is expected that the student will have met with the doctor on the date of the test.
  - I will review each sick note to determine whether there are sufficient grounds for a student to be excused from a test. Part of this review process may include meeting with the student, and/or following up with the physician.
  - It is an academic offence to feign illness to avoid a test.
- If a student has been excused from a test on medical grounds, he or she will be permitted to write a **make-up test** to be held on Friday March 17 from 2pm to 4pm (location TBA).
  - The make-up test will be worth the value of the midterm.
  - Consistent with university policy, there will be no "make-up" test for the make-up test. A grade of zero will be applied if the make-up test is requested but missed.
- If students wish to appeal a grade, they must provide a written explanation of why they believe their grade is mistaken, and submit it to the instructor within one week of the midterm being returned to the class.

There will be four **written assignments**.

- Only the three assignments on which the student obtains the best grades will count toward the final course grade (thus, if the student only submits three of the four assignments, those three assignments will count toward the final course grade).
- Written assignments must be submitted through Blackboard in a Portable Document Format (PDF). Neither paper submission nor email submission will be counted. Assignments are due by 11:59pm on their due date.
- Late assignments will not be accepted and will receive a grade of zero, unless I receive:
  (1) an email from the student to indicate that he/she will not be able to submit the assignment on time, by 11:59pm on the assignment due date, and

(2) an appropriate medical note explaining why the assignment could not be submitted on time, within the week following the assignment due date; the medical note must satisfy requirements that are analogous to the midterm's (see above).

- University disclaimer regarding Turnitin.com:

  "Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site."

Students will be evaluated on **class participation and attendance**. It is expected that students will have read the required articles prior to class and will be prepared to engage in meaningful discussion of these articles during class. Evaluation will also be based on class attendance and on whether students adhere to the class rules below.

Class rules

- All students must arrive on time and be prepared to participate in class discussion.
- The use of laptops, iPads, etc, is allowed only for the purpose of taking class notes and viewing relevant lecture materials. The use of the internet, Facebook, emails, and all other computer applications that are not essential for the current lecture or discussion, is strictly prohibited. The use of phones, iPods, etc, is strictly prohibited.
- No food is permitted in class.
- Students who do not abide by these rules may be asked to leave the class.

Name tags

Students must prepare name tags and bring these to class and put these on their desks each lecture.

Academic Misconduct

Copying, plagiarizing, or other forms of academic misconduct will not be tolerated. Any student caught engaging in such activities will be subject to academic discipline ranging from a mark of zero on the assignment, test or examination to dismissal from the university as outlined in the academic handbook. Any student abetting or otherwise assisting in such misconduct will also be subject to academic penalties. As a student it is your responsibility to ensure the integrity of your work and to understand what constitutes an academic offence. If you have any concerns that you may be crossing the line, always ask your instructor. **Ignorance of the rules does not excuse cheating or plagiarism.** For more information regarding the Code of Behaviour on Academic Matters please visit http://www.governingcouncil.utoronto.ca/policies/behaveac.htm.

For accessibility accommodation see http://studentlife.utoronto.ca/accessibility.

Optional class presentations

Interested students can form pairs and email me to volunteer to do one of six optional class presentations. To incentivize pairs of students to volunteer for the six optional presentations, I will use the following scheme to determine the "market-clearing price" (i.e., the market-clearing bonus mark) of an optional presentation:

- The six presentation slots will be granted on a "first-come, first-served" basis, based on the time when I receive relevant emails from both students in each pair.
- If six pairs of students volunteer by Friday, January 13, all volunteer presenters will get a bonus of up to 1% on their final course grade, with the precise bonus depending on the quality of each presentation; if six pairs volunteer by Friday, January 20, the bonus will be up to 2% for all presenters (the maximum bonus will be the same for all presenters, regardless of when they volunteered); if six pairs volunteer by Friday, January 27, the bonus will be up to 3%; if six pairs volunteer by Friday, February 3, the bonus will be up to 4%; if six pairs volunteer by Friday, February 10, the bonus will be up to 5%.

Pairs of presenters will be required to choose an empirical academic paper, with my guidance and prior approval, and to present the paper in class during Lecture 11 or Lecture 12. The total length of each pair's presentation will be around 20-25 minutes, including time for questions and discussion. You should be prepared to discuss the following:

- What is the main question of the paper?
- How does the paper contribute to the academic literature?
- What is the research design and empirical strategy?
- What are the main results of the paper?
- What are some of the drawbacks of the research design?
- Are there alternative explanations for the empirical results?

Each pair of presenters must book an appointment with me during my office hours at least one week prior to the presentation. Presenters must bring an advanced draft of their slides at the appointment, so that I can review the slides and provide feedback.

Students cannot withdraw from presenting without penalty after having volunteered. A penalty of 5% will be applied to the final course grade for students who volunteer for an optional presentation but fail to deliver a presentation, unless I receive:

(1) an email from the student to indicate that he/she will not be able to deliver the presentation, on the day of the presentation, and

(2) an appropriate medical note explaining why the student could not deliver the presentation, within the week following the scheduled presentation time; the medical note must satisfy requirements that are analogous to the midterm's (see above).

If a student in a pair cannot deliver his/her part of the presentation due to medical factors, the student will get no bonus marks, and the other student in the pair must deliver the entire presentation alone.

Tentative course schedule

Week	Date	Lecture topic / event
1	Jan. 11	Syllabus; introduction and motivation; econometrics review
	Jan. 13	*Tutorial:* Econometrics review 1
2	Jan. 18	Neuroeconomics, brain chemistry, and economic decision making
	Jan. 20	*Tutorial:* Econometrics review 2
3	Jan. 25	The nature and nurture of economic preferences and outcomes
	Jan. 27	*Tutorial:* Econometrics review 3
4	Jan. 31	*Assignment 1 due*
	Feb. 1	The nature and nurture of economic preferences and outcomes
5	Feb. 8	The nature and nurture of economic preferences and outcomes
6	Feb. 14	*Assignment 2 due*
	Feb. 15	Molecular genetics and economics
	Feb 20-24	*[Reading week]*
7	Mar. 1	Molecular genetics and economics
8	Mar. 7	*Assignment 3 due*
	Mar. 8	Molecular genetics and economics
9	Mar. 15	*In-class midterm*
	Mar. 17	*Make-up midterm*
10	Mar. 22	Molecular genetics and economics
11	Mar. 29	Biology and the economics of the family; two optional student presentations
12	Apr. 4	*Assignment 4 due*
	Apr. 5	Four optional student presentations

Additional tutorial sessions may be scheduled as required.

Reading list

(indicates required readings that will be covered in class; * indicates required readings; other readings are optional; all readings will be posted on Blackboard.)**

Week 1: Introduction and motivation

*Robson, A. J. (2001). The biological basis of economic behavior. *Journal of Economic Literature*, *39*(1), 11-33.

Week 2: Neuroeconomics, brain chemistry, and economic decision making

**Kosfeld, M., Heinrichs, M., Zak, P. J., Fischbacher, U., & Fehr, E. (2005). Oxytocin increases trust in humans. *Nature*, *435*(7042), 673-676.

Fehr, E., & Rangel, A. (2011). Neuroeconomic foundations of economic choice—recent advances. *The Journal of Economic Perspectives*, *25*(4), 3-30.

Crockett, M. J., & Fehr, E. (2013). Pharmacology of economic and social decision making. In *Neuroeconomics: Decision making and the brain* (pp. 259-82). San Diego: Academic Press.

Camerer, C., Loewenstein, G., & Prelec, D. (2005). Neuroeconomics: How neuroscience can inform economics. *Journal of economic Literature*, *43*(1), 9-64.

Week 3: The nature and nurture of economic preferences and outcomes

**Cesarini D, CT Dawes, M Johannesson, P Lichtenstein & B Wallace (2009). "Genetic Variation in Preferences for Giving and Risk-Taking." *Quarterly Journal of Economics*, 124: 809–842.

*Turkheimer, Eric. "Three laws of behavior genetics and what they mean." *Current Directions in Psychological Science* 9.5 (2000): 160-164.

Behrman, J. R., & Taubman, P. (1989). Is schooling "mostly in the genes"? Nature-nurture decomposition using data on relatives. *The Journal of Political Economy*, 1425-1446.

Taubman, P. (1976). The determinants of earnings: Genetics, family, and other environments: A study of white male twins. *The American Economic Review*, *66*(5), 858-870.

Week 4: The nature and nurture of economic preferences and outcomes

**Björklund, A., Lindahl, M., & Plug, E. (2006). The origins of intergenerational associations: Lessons from Swedish adoption data. *The Quarterly Journal of Economics*, 999-1028.

Sacerdote, B. (2010). Nature and nurture effects on children's outcomes: What have we learned from studies of twins and adoptees. *Handbook of social economics*, *1*, 1-30.

Sacerdote, B. (2007). How large are the effects from changes in family environment? A study of Korean American adoptees. *The Quarterly Journal of Economics*, 119-157.

Week 5: The nature and nurture of economic preferences and outcomes

**Goldberger, Arthur S. (1979). "Heritability." *Economica*, *46*(184): 327–47.

*Dobzhansky, T. (1973). Is genetic diversity compatible with human equality? *Social biology*, *20*(3), 280-288.

Jencks, Christopher. (1980). "Heredity, Environment, and Public Policy Reconsidered." *American Sociological Review*, *45*(5): 723–36.

Pinker, S. (2004). Why nature & nurture won't go away. *Daedalus*, *133*(4), 5-17.

Week 6: Molecular genetics and economics

**Bowles, S., & Gintis, H. (2002). The inheritance of inequality. *The Journal of Economic Perspectives*, *16*(3), 3-30. [*NOTE: This paper is about "nature and nurture", but we will discuss it in the week-6 lecture.*]

*Beauchamp, J. P., Cesarini, D., Johannesson, M., van der Loos, M. J., Koellinger, P. D., Groenen, P. J., ... & Christakis, N. A. (2011). Molecular genetics and economics. *The Journal of Economic Perspectives*, *25*(4), 57.

Benjamin, D. J., Cesarini, D., Chabris, C. F., Glaeser, E. L., Laibson, D. I., Guðnason, V., ... & Johannesson, M. (2012). The promises and pitfalls of genoeconomics. *Annual Review of Economics*, *4*, 627.

Week 7: Molecular genetics and economics

**Israel, S., Lerer, E., Shalev, I., Uzefovsky, F., Riebold, M., Laiba, E., ... & Ebstein, R. P. (2009). The oxytocin receptor (OXTR) contributes to prosocial fund allocations in the dictator game and the social value orientations task. *PloS one*, *4*(5), e5535.

**Apicella, C. L., Cesarini, D., Johannesson, M., Dawes, C. T., Lichtenstein, P., Wallace, B., ... & Westberg, L. (2010). No association between oxytocin receptor (OXTR) gene polymorphisms and experimentally elicited social preferences. *PloS one*, *5*(6), e11153.

*Okbay, A., Beauchamp, J. P., Fontana, M. A., Lee, J. J., Pers, T. H., Rietveld, C. A., ... & Oskarsson, S. (2016). Genome-wide association study identifies 74 loci associated with educational attainment. *Nature*, *533*(7604), 539-542.

*Chabris, C. F., Hebert, B. M., Benjamin, D. J., Beauchamp, J., Cesarini, D., van der Loos, M., ... & Freese, J. (2012). Most reported genetic associations with general intelligence are probably false positives. *Psychological science*, 0956797611435528.

Week 8: Molecular genetics and economics

**Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., Harrington, H., ... & Poulton, R. (2003). Influence of life stress on depression: moderation by a polymorphism in the 5-HTT gene. *Science*, *301*(5631), 386-389.

**Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., ... & Poulton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, *297*(5582), 851-854.

Dick, D. M., Agrawal, A., Keller, M. C., Adkins, A., Aliev, F., Monroe, S., ... & Sher, K. J. (2015). Candidate gene–environment interaction research reflections and recommendations. *Perspectives on Psychological Science*, *10*(1), 37-59.

Week 10: Molecular genetics and economics

**Tyrrell, J., Jones, S. E., Beaumont, R., Astley, C. M., Lovell, R., Yaghootkar, H., ... & Wood, A. R. (2016). Height, body mass index, and socioeconomic status: Mendelian Randomisation study in UK Biobank. *BMJ*, *352*, i582.

Ding, W., Lehrer, S. F., Rosenquist, J. N., & Audrain-McGovern, J. (2009). The impact of poor health on academic performance: New evidence using genetic markers. *Journal of health economics*, *28*(3), 578-597.

Week 11: Biology and the economics of the family

*Cox, D. (2007). Biological Basics and the Economics of the Family. *The Journal of Economic Perspectives*, *21*(2), 91-108.

Becker, G. S. (1976). Altruism, egoism, and genetic fitness: Economics and sociobiology. *Journal of economic Literature*, *14*(3), 817-826.

Weeks 11 and 12: Optional student presentations

[*The six papers that will presented are still to be selected. Students do not need to read all six papers in detail, but they must have a good look at the papers (i.e., read the abstracts, and skim the papers, and look at the key tables, and results) ahead of the optional presentations and come to class prepared to discuss each paper.*]

Other optional readings

Cook, C. J. (2015). The Natural Selection of Infectious Disease Resistance and Its Effect on Contemporary Health. *Review of Economics and Statistics*, *97*(4), 742-757.

Giuliano, P., Spilimbergo, A., & Tonon, G. (2014). Genetic distance, transportation costs, and trade. *Journal of Economic Geography*, *14*(1), 179-198.

Guedes, J. D. A., Bestor, T. C., Carrasco, D., Flad, R., Fosse, E., Herzfeld, M., ... & Patterson, N. (2013). Is poverty in our genes?. *Current Anthropology*, *54*(1), 71-79.

Hirshleifer, J. (1978). Competition, cooperation, and conflict in economics and biology. *The American Economic Review*, *68*(2), 238-243.

Hirshleifer, J. (1977). Economics from a biological viewpoint. *The Journal of Law & Economics*, *20*(1), 1-52.

Quamrul, Ashraf, and Galor Oded. (2013). The 'Out of Africa'Hypothesis, Human Genetic Diversity, and Comparative Economic Development. *American Economic Review, 103*(1): 1-46.

Robson, A. J. (2002). Evolution and human nature. *The journal of economic perspectives*, *16*(2), 89-106.

Samuelson, P. A. (1985). Modes of thought in economics and biology. *The American Economic Review*, *75*(2), 166-172.

Samuelson, P. A. (1993). Altruism as a problem involving group versus individual selection in economics and biology. *The American Economic Review*, *83*(2), 143-148.

Spolaore, E., & Wacziarg, R. (2009). The diffusion of development. *The Quarterly Journal of Economics*, *124*(2): 469-529.