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**Economics 201FS
Junior Research Seminar, Spring 2009**

**Research Seminar and Lab on High Frequency Financial Data
Analysis for Duke Economics Juniors**

Professors Tim Bollerslev, Bruno Feunou, and George Tauchen

[Professor Bollerslev](#) 313 Social Science

[Professor Bruno Feunou](#) 208 Social Science

[Professor Tauchen](#) 224 Social Science

[SCHEDULE](#): Week-by-week schedule of activities. Visit this link often since it will be often updated.

[PRESENTATIONS 2009](#): The slides for talks this semester. Visit this link frequently.

[PREVIOUS \(2008\) PRESENTATIONS](#): View the student presentations from last year (Spring 2008).

[DOWNLOADS](#): Most of the background documents are in electronic form in this folder

[PROJECTS](#): Data and details related to research projects.

[PREVIOUS FINAL THESIS PAPERS](#): Final papers from Econ 202FS, the second semester of the sequence.

[CODE](#): Useful Matlab routines

[GUIDELINES FOR FINAL REPORT](#)

[Rules for Formatting Documents](#): Applies to all documents turned in for evaluation and grading.

Assistance: The contact information for Mike is:

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Description: Students will learn to use tools and techniques developed in statistics and economics to conduct research into the structure of financial markets at the very high frequencies. The topics to be considered include testing for jumps in financial prices, the role of high frequency microstructure noise that masks the fundamental price, the importance of macroeconomic news announcements, the roles of various asymmetries

such as volatility feedback, and interactions across financial markets at the very high frequency. The primary objective of the course is for each student to produce a research project that contributes new insights into the overall understanding of how the financial markets work. Students start with a defined research project that entails analyzing data sampled as finely as 30 seconds or five minutes and possibly at the second-by-second tick level. Students whose research goes substantively beyond the starting project will be encouraged to proceed to an honors thesis in their senior year.

Theme: Our special theme for this year is to implement and evaluate some very recently developed new methods for handling high frequency data, with an emphasis on methods for taking account of the “micro-structure noise” that reflects very short term trading frictions.

Procedures: This course is a seminar course that requires substantial student involvement with the material and the data analysis. It is not a traditional lecture/exam type course. In order to see and understand the process of generating new research, students attend the Monday graduate [Financial Econometrics Lunch](#). Undergraduates then participate very actively at the Wednesday meeting. Each Wednesday, between two or three undergraduates will give presentations on the progress of their on-going research. The faculty mentors, the other undergraduates, and a graduate student(s), provide suggestions and guidance for future directions. Each undergraduate can expect to give three to four presentations over the semester. After a date is determined for a student’s presentation, that date cannot be changed and the student is expected to deliver a presentation on progress to date on the assigned date.

Prerequisites: MATH 110, STA 103, intermediate economics ECON 110, 115, econometrics ECON 139 (may be taken concurrently), at least one 100-level finance course ECON 157, 158, or 181 (finance may also be taken concurrently). Additional advanced work in mathematics such as advance calculus, differential equations, real analysis, statistics and probability, along with experience in computer programming such as Java, C++, or another language, would be very helpful. Registration is by permission only, which is obtained via e-mail to the instructors.

Eligibility: The course is available to junior undergraduate economics majors contemplating an honors thesis in their senior year. Qualified sophomores and juniors in other technically orientated majors will get consideration.

Expectations: The task of producing original research is both serious and demanding. Students are expected to maintain steady progress on their projects, to give thoughtful and detailed presentations of work in progress, and to participate actively in the Wednesday meetings. Regrettably, and unlike some other college assignments, original research and a thoughtful presentation simply cannot be hastily assembled the night before a presentation is due.

Attendance: Attendance at both the Monday and Wednesday meetings is mandatory. Role will be taken and an attendance record maintained. Unexcused absences will be grounds for dismissal with a withdrawal (W) or failing (F) grade.

Grading: At the outset, students will download and clean their own data set with well-defined indications of the initial topics to investigate. This starter project will enable students to learn the basic techniques of conducting research and become familiar with the process of giving presentations of work in progress. The final grade (B) requires a satisfactory attendance record on Monday and Wednesdays, active participation on Wednesdays, and completion of a written report on the assigned research topic. A lower grade, including failure (F), would apply to performance below this standard. The final grade (A) additionally requires further development and extension of the assigned project in directions motivated by issues that arise during execution of the defined project and further reading of the literature. Students earning an A grade will be encouraged to proceed to an honors thesis in their senior year.