This course is co-taught with Jawwad Noor. This part will focus on *choice under uncertainty*. Topics to be covered include the theory of subjective probability, ambiguity, demand for flexibility, dynamic choice, updating/learning, and some models of "bounded rationality."

The grade for this part of the course will be based on class participation, assignments, and a referee report, with weights to be determined once we meet.

The class will be based mostly on articles, but I recommend that you purchase:


The following should help with the big picture:

E. Dekel & B. Lipman, How (not) to do decision theory, *Annual Rev. Econ.* 2 (2010), 257-82
W. Pesendorfer, Behavioral economics comes of age, *JEL* 44 (2006), 712-21

R. Spiegler, Behavioral economics and the atheoretical style, 2017
#1. SUBJECTIVE PROBABILITY

THE SAVAGE MODEL
Savage: Chs. 1-6; **Kreps: Chs. 4, 8 and 9; Gilboa: Part II
**M. Machina & D. Schmeidler, A more robust definition of subjective probability, *Econometrica* 60 (1992), 745-780
I. Kopylov, Subjective probability on ‘small’ domains, *JET* 133 (2007), 236-265
I. Kopylov, Simple axioms for countably additive subjective probability, *J. Math. Econ.* 46 (2010), 867-76
J. Lu, A Bayesian theory of state-dependent utilities, 2016
Kreps, Ch. 11: the exchangeable Bayesian model

THE ANSCOMBE-AUMANN MODEL
**Kreps, Chs. 4 (domains of choice), 5 (the mixture-space theorem), Ch. 7

Overviews & critiques
N. Giocoli, Postwar game and decision theory: a historical perspective, 2014 [slides]
Gilboa, Rationality and the Bayesian paradigm, *J. Econ. Methodology*, 2014
M. Machina, States of the world and the state of decision theory, 2003
E. Karni, States of nature and the nature of states, 2016
**A. Billot, I. Gilboa, D. Samet & D. Schmeidler, Probabilities as similarity-weighted frequencies, *Econometrica* 73 (2005), 1125-1136; and Gilboa, Part IV
#2. AMBIGUITY/Model Uncertainty

D. Ellsberg, Risk, ambiguity and the Savage axioms, QJE 75 (1961), 643-669

**Gilboa, Part III.

Gilboa, Postlewaite, & Schmeidler, Rationality of belief or: why Savage’s axioms are neither necessary nor sufficient for rationality, Synthese 187 (2012), 11-31

M. Siniscalchi, Ambiguity and ambiguity aversion, Palgrave Dictionary of Economics.


Models


F. Maccheroni, M. Marinacci & A. Rustichini, Ambiguity aversion, robustness and the variational representation of preferences, Econometrica 74 (2006), 1447-1498

T. Bewley, Knightian decision theory (part I), Decisions in Econ. and Finan. 2002, 79-110

Gilboa et al, Objective and subjective rationality in a multiple prior model, Econometrica 2010


Epstein & Seo, Exchangeable capacities, parameters and incomplete theories, JET May 2015

Critiques/extensions

M. Machina, Ambiguity aversion with three or more outcomes, AER Dec 2014

K. Saito, Preferences for flexibility and randomization under uncertainty, AER March 2015

S. Ke and Q. Zhang, Randomization and ambiguity aversion 2017

T. Hayashi et al, Attitude toward imprecise information, JET 140 (2008), 27-65

Experiments/measurements


E. Calford, Uncertainty aversion in game theory: experimental evidence 2015

Chew, Miao and Zhong, Partial ambiguity, Econometrica 2017

Applications

Epstein and Schneider, Ambiguity and asset markets, Ann. Rev. Finan. Econ. vol 2, 2010

D. Dicks and P. Fulghieri, Uncertainty aversion and systemic risk, JPE forthcoming

S. Bose and L. Renou, Mechanism design with ambiguous communication devices, Econometrica 82 (2014), 1853-1872

G. Carroll, Robustness and linear contracts, AER 2015. S. Auster, Robust contracting under common value uncertainty, TE 2017


**Epstein, Kaido and Seo, Robust confidence regions for incomplete models, Econometrica 2016
#3. DEMAND FOR FLEXIBILITY/Subjective States


Amador, Werning and Angeletos, Commitment vs flexibility, *Econometrica* 2005

K. Saito, Preferences for flexibility and randomization under uncertainty, *AER* March 2015


K. Hyogo, A subjective model of experimentation, *JET* 2007

N. Takeoka, Subjective probability over a subjective decision tree, *JET* 2007

Dillinberger, Lleras, Sadowski and Takeoka, A subjective theory of learning, *JET* 2014


#4. RISK and TIME

**M. Machina, Dynamic consistency and non-expected utility models of choice under uncertainty, *JEL* 27 (1989), 1622-1668


**Kreps and Porteus, Temporal resolution of uncertainty and dynamic choice theory, *Econometrica* 46 (1978), 185-200


Epstein, Farhi and Strzalecki, How much would you pay to resolve long-run risk? *AER* 2014


T. Sarver, Mixture-averse preferences 2017

F. Kubler, Is intertemporal choice theory testable? *JME* 2004

Nonrecursive models

A. Caplin and J. Leahy, Psychological expected utility and anticipatory feelings, *QJE* 2001, 65-80; and The supply of information by a concerned expert, Econ. J. (2004), 487-505


Epstein, Living with risk, *Restud* 2008

T. Eisenbach and M. Schmalz, Anxiety in the face of risk, *JFE* 2016

E. Lipnowski and L. Mathevet, Disclosure to a psychological audience 2017
#5. AMBIGUITY and TIME (Updating)
A. Elga, Bayesian humility, *Phil. Sc.* 83 (2016), 305-23

Gilboa and Schmeidler, Updating ambiguous beliefs, *JET* 59 (1993), 33-49
M. Marinacci, Learning from ambiguous urns, *Statistical Papers* 43 (2002), 143-51
Epstein & Schneider, Recursive multiple-priors, *JET* 2003; and
Gul & Pesendorfer, Evaluating ambiguous random variables and updating by proxy 2017

R. Guong and Xiao-Li Meng, Judicious judgment meets unsettling updating: dilation, sure loss, and Simpson’s Paradox 2017
S. Bradley and K. Steele, Can free evidence be bad? value of information for the imprecise probabilist, *Phil. Sc.* 83 (2016), 1-28


#5. "BOUNDED RATIONALITY"

Attention
A. Ellis, Foundations for optimal inattention, *JET* forthcoming
H. Oliveira, Axiomatic foundations for entropic costs of attention, 2014
Denti, Oliveira, Mihm, and Ozbek, Rationally inattentive preferences with hidden information costs, *TE* 2017
Chambers, Liu and Rehbeck, Nonseparable costly attention and revealed preference 2017
J. Lu, Random choice and private information, *Econometrica* 84 (2016), 1983–2027 [we may consider an extension due to Yi-Hsuan Lin]

Foresight
J. Rust, Do people behave according to Bellman’s principle of optimality, 1992
A. Kochov, A behavioral definition of unforeseen contingencies 2018
Shaowei Ke, Boundedly rational backward induction 2017
Shaowei Ke, Rational expectation of mistakes and a measure of error-proneness, *TE* forthcoming
Framing
**Tversky and Kahneman, The framing of decisions and the psychology of choice, Science 211 (1981), 453-8
D. Ahn & H. Ergin, Framing contingencies, Econometrica 78 (2010), 655-695
I. Kopylov, Framing in expected utility and multiple-priors models 2017
R. Spiegler, Bayesian networks and boundedly rational expectations, QJE 2016

Correlation
**A. Ellis and M. Piccione, Correlation misperception in choice, AER 2017
G. Levy and R. Razin, Combining forecasts: why decision makers neglect correlation, 2017
Epstein and Y. Halevy, Ambiguous correlation 2017 [experiment]

Response time
**D. Fudenberg, P. Strack and T. Strzalecki, Speed accuracy & optimal timing of choices, 2016
F. Echenique & K. Saito, Response-time and utility 2015
D. Kahneman, Thinking, Fast and Slow 2011