The Berkeley program in empirical methodology and formal theory offers rigorous training that is carefully integrated with major substantive agendas in political science.

The program builds centrally on innovative faculty research, which encompasses new methods for causal inference and program evaluation, as well as statistical computing and survey analysis. The work on surveys has included path-breaking contributions to developing and refining experiments embedded in surveys and computer-assisted telephone interviewing; and innovations in measuring issue orientations and in multi-level modeling of political behavior. In formal theory, faculty have contributed to opening new lines of inquiry into strategic interactions where formal institutions are weak, and to modeling information and incentives in organizations—as they affect both the dynamics of institutions within the United States and those in authoritarian and democratizing regimes. Faculty in both traditions play a prominent role in developing empirical tests of formal theory, based on both laboratory experiments and observational data. The faculty has also done influential work on qualitative methodology, comparative-historical methods, and linking qualitative methods with both quantitative tools and with formal analysis.

The methods/formal faculty makes important institutional contributions on the Berkeley campus. They convene the Positive Political Theory Seminar, which draws together a national constituency of leading modelers for its biweekly meetings. They have led the campus Survey Research Center and helped to sustain its innovative research on survey methodology; and they were central to launching the Berkeley’s NSF/IGERT training program in Politics, Economics, Psychology, and Public Policy (PEPPP). Berkeley’s Institute of Governmental Studies, as well as the Survey Research Center, are important venues for convening scholars and graduate students, and they provide support for graduate students pursuing methodological and formal training.

Faculty members also play leading roles in the national political science profession. Their contributions have included serving as Chair of the Board of the American National Elections Studies (ANES); providing crucial leadership in launching the NSF program on the Empirical Implications of Theoretical Models (EITM); co-editing the new Oxford Handbook of Political Methodology; serving as President of the Political Methodology Society; and founding APSA’s Organized Section for Qualitative and Multi-Method Research. The political science department maintains close ties with the national Institute for Qualitative/Multi-Method Research, and many graduate students attend the institute. Three of the methods/formal faculty are Fellows of the American Academy of Arts and Sciences.
Graduate Training

The graduate program offers a broad introduction to methodology and formal analysis, as well as providing advanced training that is pursued by many students. A semester-long math course is offered annually, and is a prerequisite for all other methods courses. Building on this foundation, students who seek general introductory training may pursue one of four tracks that make up the “course-out option,” through which they can satisfy the requirement for one of their Ph.D. exams. Beyond that level, many students take a substantial number of additional courses. Some of these students – particularly those who intend to become professional methodologists and/or modelers – take the Ph.D. exam, which presumes a high level of training, and for which they may choose to focus primarily either on empirical methodology, or on formal theory.

The building blocks of the program are as follows:

1. **Math Course.** This semester-long course, *Essential Mathematical Tools*, is a prerequisite for all other methods courses. In contrast to the brief, end-of-the summer course offered by some graduate political science programs, this course provides a thorough review of basic math, establishing a shared foundation of math skills that is the point of departure for the methods sequence. The course focuses on basic topics in functions, calculus, optimization, linear algebra, and probability. As an alternative to this course, students may demonstrate adequate preparation by taking an equivalency test.

2. **Course-Out Option.** Four alternative tracks are offered for the course-out option. Building on the math course, all the tracks require two core courses: *Quantitative Analysis in Political Research* (231a) and *Formal Models in Political Science–Part I* (232a). One further course is required for each track.


3. **Further Training.** Many students pursue extensive further training, through which they deepen their command of methodology and formal analysis, prepare for the Ph.D. exam, learn to apply advanced analytic tools in their own research, and in some cases become professional methodologists or formal theorists. Some of these students publish articles on empirical methods —both quantitative and qualitative—while in graduate school, as well as articles based on formal analysis.

   3a. **Empirical Methods.** The following courses are offered for students who seek more advanced training: *Time-Series and Event History Analysis* (231b), *Psychometrics and Econometrics* (233), *Political Behavior Models, Game Theory, and Statistical Methods* (260), and *Advanced Topics in Quantitative Methodology* (239-2). The advanced topics courses will include *Applied Bayesian Modeling in Political Science*. Students routinely extend their methodological
skills by taking courses in the Departments of Statistics and of Economics. Over past few years, quite a few have pursued an M.A. degree in one or the other of those departments.

3b. Formal Theory. The training in formal modeling, building on the introductory treatment of game theory (232a), links modeling with substantive applications that span all areas of political science. All of the courses are appropriate for students wishing to incorporate modeling into their own research, regardless of their subfield. Formal Models in Political Science-Part II (232b) extends the coverage of 232a to other families of models; recent treatments have focused on bargaining problems and inefficiencies in politics, with particular reference to interstate conflict. This course covers different substantive areas each year, and may be repeated for credit. Thus, Formal Models in American Politics (232a) treats specific models in greater depth – for example, models of bargaining and information asymmetries – and illustrates their application in the study of American political institutions. A similar course is planned in comparative politics. Applications of formal models to the field of political behavior, as well as the rigorous empirical testing of formal models are addressed in the course noted above on Political Behavior Models, Game Theory, and Statistical Methods (260).

A number of students further develop their skills by taking additional advanced courses on game theory, decision theory, information economics/contract theory, and models in political economy, which are offered multiple times each year in the Department of Economics and the Business School. Students developing advanced modeling skills, like those working on empirical methodology, have pursued an M.A. in Economics.
Faculty Who Teach Graduate Courses on Empirical Methodology and Formal Theory

**Henry E. Brady.** Econometrics and psychometrics, multi-method strategies, empirical tests of formal models. Current work on voting systems, corporate lobbying, and the role of ethnic cleavages in the collapse of the Soviet Union.

**David Collier.** Qualitative analysis, multi-method research, concept analysis, comparative-historical method. Democratic and authoritarian regimes, with a particular focus on Latin America.

**Sean Gailmard.** Game-theoretic and statistical modeling of political processes, laboratory-based experimental research on individual choice in collective decision-making. Focus on American political institutions.

**Peter Lorentzen.** Formal models of non-democratic politics and institutions, qualitative testing of formal models. Studies the dynamics of authoritarian regimes, with a central focus on China.

**Robert L. Powell.** Game-theoretic analysis of war, political conflict, and the politics of weakly institutionalized settings. Current work includes research on terrorism.

**Jasjeet Singh Sekhon.** Causal inference in observational and experimental studies, program evaluation, statistical theory and methods, statistical computing. Current research includes exploration of innovative survey methods for the study of voting behavior.

**J. Merrill Shanks.** Survey data collection and analysis, social science computing, electoral behavior, and public opinion. Current work includes developing new measures of citizen views on policy issues.

**Laura Stoker.** Research design, survey methods, sampling, quantitative analysis, multi-level modeling, history of statistics. Current work includes a focus on the dynamics of public opinion across generations and over the life-cycle.

**Jason Wittenberg.** Large-N statistical methods, multi-method strategies, computational modeling, archival research. Current work includes developing new software for ecological inference and analyzing the social bases of political radicalism in interwar Eastern Europe.

Additional Political Science Faculty who Specialize in Formal Theory and its Applications

**Rui de Figueiredo.** (Joint with Business School) Formal models of political institutions, quantitative empirical tests of formal models. Focus includes study of bureaucratic structures and performance, and of ethnicity.

**Gérard Roland.** (Joint with Economics) Formal models of comparative politics, political economy of economic transitions. Focus on institutional change in the European Union, Eastern Europe, Russia, and Asia.

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