

RICHENG (RYAN) PIAO

Assistant Teaching Professor of Economics · Director of AI Teaching Innovation, CSSH

Northeastern University · Lake Hall 312, 43 Leon St, Boston, MA 02115

(781) 990-8899 · r.piao@northeastern.edu · richeng.info · linkedin.com/in/richengpiao · github.com/ryanpiao

AREAS OF INTEREST

- **Teaching:** Microeconomic Theory, Macroeconomics, Game Theory & Information Economics, Industrial Organization, Econometrics, Applied Statistics, Applied Data Analytics, and Statistical & Machine Learning for Economics.
- **Research:** Industrial organization and platform economics; algorithmic pricing and antitrust; causal inference and machine learning; the labor-market and pedagogical effects of generative AI.

EDUCATION

Northeastern University

Boston, MA

Ph.D. in Economics (Industrial Organization) — August 2021

University at Albany, State University of New York

Albany, NY

B.S. in Economics (Honors Program) and B.S. in Mathematics — May 2012

ACADEMIC APPOINTMENTS & LEADERSHIP

Director of AI Teaching Innovation

August 2026 – June 2027

College of Social Sciences and Humanities, Northeastern University

- College-level appointment under Northeastern's Curricular Transformation Initiative, funded by the Offices of the Provost and Chancellor, to build faculty AI capacity across CSSH.
- Convene and lead a faculty community-of-practice cohort that experiments with AI-aware teaching, exchanges discipline-specific practice, and evaluates the effectiveness of redesigned activities and assessments.
- Design and deliver workshops and collegial programming that meet faculty across the novice–expert spectrum, grounded in the university AI Readiness framework and Assessment & AI Task Force guidance.
- Built and maintain the CSSH “AI in Teaching” faculty resource hub: plain-language policy guidance, copyable syllabus statements, an AI-resilient assignment toolkit, and a gallery of interactive classroom examples.
- Document innovative faculty practice as shareable exemplars; co-convene the collegewide AI showcase with the Director of AI Curricular Transformation, featuring faculty work and employer perspectives on AI in the workplace.
- Meet monthly with Directors across all Northeastern colleges to cross-pollinate resources and problem-solve; administer a \$10,000 innovation grant budget.

Assistant Teaching Professor of Economics

Northeastern University

Department of Economics, College of Social Sciences and Humanities

Founder & Chief Executive Officer

2023 – Present

Husky Technology Inc. / Sharon Group, LLC

- Lead product and operations for ventures applying economic modeling and hardware engineering to education and service-industry problems, including a Secure Digital Exam System (E-Ink, AOSP kiosk-mode Hardware-as-a-Service for universities) and humanoid-robot control applications for commercial kitchens.

TEACHING EXPERIENCE

Department of Economics, Northeastern University, Boston, MA

Statistical & Machine Learning for Economics (ECON 3916)

Spring 2026 – Present

- **Curriculum design:** built a unified framework bridging classical econometrics and data science through a “Concept Extension” pedagogy that scales statistical foundations to high-dimensional machine learning.

- Covered causal machine learning (Double ML, causal forests), high-dimensional regression (Lasso/Ridge), NLP for economists, and predictive modeling with pandas, scikit-learn, and EconML.
- Delivered dual-modal instruction pairing theory seminars for economic intuition with computational laboratories in Google Colab.
- Authored a companion textbook with dual-audience depth blocks so graduate (5200) and undergraduate (3916) sections share one coherent text.

Applied Data Analytics in Economics (ECON 5200)

Spring 2025 – Present

- **Developed the “Foundations First, Expansion Second” curriculum**, which strictly sequences manual Python coding (OLS and DiD derivation) before generative-AI tooling is introduced.
- **Designed the P.R.I.M.E. Prompting Framework**, which positions students as “junior analysts” who use AI to scale analysis (e.g., propensity-score matching) while retaining rigorous economic verification.
- Integrated experiential learning with real-world BLS and FRED data in Python and Jupyter to close the gap between economic theory and data-science practice.

Game Theory (ECON 1916)

Fall 2025 – Present

- New course preparation: designed a full curriculum on strategic decision-making, Nash equilibrium, dynamic games, and asymmetric information.
- Built interactive in-class simulations and case studies that demonstrate game-theoretic principles in real-world strategic settings.

Microeconomic Theory (ECON 2316)

2023 – Present

- Taught calculus-based intermediate theory: utility maximization, demand, cost minimization, equilibrium, and strategic decision-making via mathematical formalism and optimization.
- Examined market imperfections — public goods, externalities, asymmetric information, and imperfect competition — with emphasis on policy implications.
- Designed experiential assignments in which students apply optimization techniques to real-world scenarios, bridging theory and practice.

Information Economics & Game Theory (ECON 4681)

2020 – Present

- Designed and delivered an applied curriculum on strategic interaction across economics, politics, and business.
- Facilitated in-class games, case studies, and analysis of real-life scenarios covering Nash equilibria, evolutionary game theory, repeated interaction, and asymmetric information.
- Introduced systematic research methodology, guiding students from equilibrium solving toward original research questions.

Principles of Microeconomics (ECON 1116)

2019 – Present

- Deliver active-learning lectures on supply and demand, elasticity, market structure, and externalities using current events and case studies.
- Designed mini-projects for hands-on learning, including price-elasticity estimation from CPI and CES data.
- Guided fieldwork in which students assess market competitiveness in real retail settings and present findings in written reports and online discussion.

Principles of Macroeconomics (ECON 1115)

2017 – Present

- Deliver lectures on GDP, inflation, unemployment, and business cycles using real-world data and contemporary policy.
- Analyze historical and contemporary crises — the Great Depression, the oil crises, the dot-com bubble, 2008, and the pandemic — to build causal intuition.
- Lead group projects using World Bank indicators (real GDP per capita, unemployment, inflation, labor-force participation, saving, investment, net capital outflow), then synthesize cross-group findings in class.
- Incorporate post-pandemic monetary policy, including the IORB rate, to keep the course current.

Applied Econometrics (ECON 2560)

Summer 2023

- Delivered instruction in regression analysis, causal inference, time-series methods, and panel data.
- Supervised applied projects using BLS and FRED data on contemporary economic questions.

Applied Statistics for Economics (ECON 2560)

Fall 2022

- Taught probability distributions, hypothesis testing, regression, and data visualization for business and economic applications.
- Emphasized Python and Excel workflows for analyzing real datasets and interpreting results in a decision context.

Money and Banking (ECON 3442)

2016 – 2017

- Taught monetary economics: financial market structure, central banking, and the transmission of monetary policy.
- Connected theory to practice through crisis-era and post-crisis policy analysis and student projects on interest rates, inflation targeting, and financial stability.

CURRICULUM & EDUCATIONAL TECHNOLOGY DEVELOPMENT

Principles of Microeconomics — Interactive Open Textbook

2025 – Present

- Authoring a full-length interactive microeconomics textbook (Next.js/MDX) with embedded, manipulable economic visualizations in place of static figures, written to replace a commercial textbook for ECON 1116.
- Built the surrounding course system: chapter podcasts, H5P auto-graded homework banks, Canvas New Quizzes (QTI) question banks, in-class attendance activities, and guided problem walkthroughs.

Course Automation & Assessment Infrastructure

2025 – Present

- Developed an API-driven Canvas LMS deployment pipeline that builds complete course modules — gated prerequisites, weighted gradebook structure, quiz imports, and consistent visual styling — programmatically rather than by hand.
- Built a reproducible question-bank generator across five auto-graded item types with $\text{\LaTeX}$ math support, covering every chapter of the principles sequence.

Lecture, Animation & Media Pipelines

2025 – Present

- Built a reveal.js lecture-viewer application with presenter mode, dual-monitor sync, pacing indicators, and WCAG-compliant themes, replacing slide-deck software across courses.
- Produce Manim-based economics animations (supply and demand, welfare analysis, game theory, comparative statics) and a video pipeline that converts chapters into teaching videos.

CSSH AI in Teaching Resource Hub

2026

- Designed and published a faculty-facing hub translating university AI policy into plain language, with copyable syllabus statements, AI-resilient assignment redesign patterns by assignment type, a disclosure template, and a filterable gallery of live interactive classroom examples.

RESEARCH

WORKING PAPERS AND RESEARCH IN PROGRESS

The New Age of Collusion? Algorithmic Pricing, Market Conduct, and Antitrust Risk in U.S. Major Cities 2026

Uses a multicity quasi-experimental design combining unsupervised machine learning on Airbnb host behavior with fuzzy regression discontinuity and instrumental-variables estimation. Finds that algorithmic Smart Pricing does not raise average market rents; it instead acts as a productivity multiplier for sophisticated hosts, sharply increasing forward-looking price volatility and price discrimination. Offers direct implications for antitrust treatment of pricing software in digital marketplaces.

AI Assistance and the Distribution of Software Output: Evidence from a Calibrated Team-Week Panel 2026

Examines whether team-level adoption of AI coding assistance shifts junior developers' share of observable output, using an 18-month team-week panel and an identification sweep across TWFE, event-study, stacked DiD, and reweighted DiD specifications.

U.S. AI Job Exposure and Wage Growth 2026

Tests whether occupations with higher AI exposure experienced different wage growth after the post-2022 acceleration. Baseline effects are small and imprecise, supporting a cautious reading of current exposure measures as screening tools rather than evidence of a wage break.

X API Pricing and the Maintenance Slowdown of Third-Party Python Tooling 2026

Documents a sharp post-2023 maintenance slowdown among Twitter/X-dependent open-source tools relative to comparison API libraries, using public PyPI and GitHub histories as a clean benchmark for platform-shock effects on complementor innovation.

ChatGPT, Stack Overflow, and GitHub Issue Burden in Open-Source Repositories 2026

Links repository-month issue outcomes to language-specific Stack Overflow activity and AI-exposure proxies, finding faster initial triage but mixed resolution depth.

PyPI's Mandatory 2FA and Release Velocity in High-Impact Python Packages 2026

Tests whether the critical-project 2FA requirement slowed release activity; estimates are small and statistically weak, indicating that stronger account security did not visibly choke package maintenance.

AI Capex Shocks and Semiconductor Pricing Dynamics 2026

Shows that hyperscaler equity movements are strongly associated with semiconductor returns and that the effect is amplified for chipmakers with higher AI exposure, yielding an exposure-weighted framework for risk and positioning.

Algorithmic Pricing and Demand Elasticity in App-Based Grocery Delivery 2025

Studies how algorithmically adjusted delivery fees relate to conversion, retention, and order frequency, using fixed-effects and difference-in-differences estimation with event-study diagnostics and segment heterogeneity.

Broadband Expansion and Labor Outcomes 2025

Estimates the association between regional broadband subscription intensity and labor-market outcomes, with emphasis on remote-work participation and income dynamics, using county-year panel data.

Can Community Funding Replace Intellectual Property for Creative Sustainability? 2024

Uses a repeated-game framework to ask whether recurring patronage platforms can substitute for the incentive functions of formal IP regimes; shows that as patronage and social norms strengthen, reliance on IP enforcement declines.

DISSERTATION

- “Quality, Variety, and Welfare: The U.S. Smartphone Market”
- “Fuel Prices, Federal Tax Credits, and Welfare: A Case of the Electric Automobile Industry”

CONSULTING & EXPERT ENGAGEMENT

Antitrust & Algorithmic Pricing Consultation 2025

Patrick Malone & Associates, PC.

- Advised legal practitioners on antitrust claims involving Airbnb and algorithmic pricing software.
- Provided expert input on econometric identification (RDD and fuzzy RDD) and structural demand estimation to quantify consumer-welfare effects in digital platform markets.

SERVICE & LEADERSHIP

Chair, Diversity, Equity, Inclusion & Belonging (DEIB) Committee 2025

Department of Economics, Northeastern University

- Led the department’s first DEIB climate survey assessing faculty and student belonging.
- Launched the “XChange Lunch” series to build cross-cultural mentorship and community.
- Chaired committee meetings and advised department leadership on inclusivity initiatives.

Member, CSSH AI Readiness Committee 2025 – Present

- Contribute to college-level strategy on AI pedagogy and curriculum adaptation across the College of Social Sciences and Humanities.

Member, Economics Graduate Admissions Committee 2025 – Present

- Review graduate applications to identify and recruit high-potential candidates.

Faculty Advisor & Research Mentor 2025 – Present

- Directed Studies supervisor for undergraduate research projects (Spring and Summer 2025); faculty member of the Economics Graduate Students Association (EGSA).

TECHNICAL SKILLS

- **Languages & Tools:** Python (pandas, NumPy, scikit-learn, statsmodels, EconML, Matplotlib, BeautifulSoup), R (ggplot2, caret, glmnet), SQL, Stata, Jupyter, Git/GitHub, $\LaTeX$, Tableau, AWS.
- **Methods:** Structural demand estimation (BLP), difference-in-differences and event study, regression discontinuity (sharp and fuzzy), instrumental variables, panel methods, causal machine learning (Double ML, causal forests), high-dimensional regression, clustering, NLP.
- **Teaching Technology:** Canvas LMS and its REST API, H5P interactive content, QTI assessment authoring, reveal.js, Next.js/React, Manim, Remotion, PollEverywhere, Canva; design of interactive polls, data visualizations, and classroom analytics projects.
- **Languages:** Native in Chinese and Korean; fluent in English.

HONORS & AWARDS

- **Google Data Analytics Professional Certificate** — 2025.
- **IBM Data Science Professional Certificate** — 2021; applied machine learning to VR-game data in the Applied Data Science Capstone.
- **Ph.D. Fellowship, Northeastern University** — 2012–2021; awarded for academic excellence and research potential.
- **Gordon Karp Award, University at Albany** — May 2012; for outstanding academic achievement in Economics.
- **Dean's List, University at Albany** — 2009–2012.

PROFESSIONAL DEVELOPMENT

- Curricular Transformation Initiative Director Kickoff Retreat, Northeastern University — September 2026.
- CATLR: “Navigating Uncertainty in Higher Education” and “Teaching in Uncertain Times” — 2025.
- ADVANCE Office of Faculty Development: Faculty Fellowship Inspiration Session — 2025.

REFERENCES

Dr. James Dana

Dissertation Committee Chair

Professor of Economics and Strategy

Northeastern University

(617) 373-7517 · j.dana@northeastern.edu

Dr. Michael P. Stone

Interim Chair and Teaching Professor of Economics

Northeastern University · m.stone@northeastern.edu

Dr. Robert Triest

Professor of Economics

Northeastern University

r.triest@northeastern.edu