

# Peng Chen

DATA SCIENTIST | CONSULTANT

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## Education

### The Pennsylvania State University

University Park, PA

PHD IN INDUSTRIAL ENGINEERING & OPERATIONS RESEARCH (IEOR) WITH MINORS IN STATISTICS AND MATHEMATICS

2015 - 2020

- Advisor: Enrique Del Castillo, Distinguished Professor of Industrial Engineering and Professor of Statistics
- Dissertation: Confidence Regions for Response Surface Optima Based on Parametric and Nonparametric Models

### University of Missouri - Columbia

Columbia, MO

MS IN INDUSTRIAL ENGINEERING

2013 - 2015

- Advisor: James Noble, Professor and Department Chair of Industrial Engineering
- Thesis: Optimizing the Toyota Kanban Production System based on Markov Chain and Simulated Annealing Algorithm

### East China University of Science and Technology

Shanghai, China

BS IN ELECTRICAL ENGINEERING, BA IN FINANCIAL MANAGEMENT

2009 - 2013

## Technical Background

- Mathematics: linear algebra, real analysis, functional analysis, numerical computations at Penn State University (PSU)
- Optimization: linear programming, convex optimization, nonlinear programming, statistical process optimization at PSU
- Statistics: linear models, experimental design, probability theory, statistical theory, stochastic process and MCMC, spatial statistics, time series at PSU
- Artificial Intelligence and Machine Learning: machine learning at PSU, deep learning specialization at deeplearning.ai

## Technical Skills

- Advanced R
  - Predictive modeling / machine learning: tidymodels, torch, keras
  - Statistical inference and modeling: infer, rstanarm, rjags
  - Time series and forecasting: forecast, tsibble, fable
  - High performance computing: foreach, future, Rfast, Rcpp
  - Data engineering: DBI, sparklyr, dplyr, data.table, arrow
  - Data visualization and communication: ggplot2, rmarkdown, flexdashboard, highcharter, DT, gt
  - Software engineering: devtools, shiny, plumber
  - Repository and library management
- SQL - logical execution order, temp tables/views, CTEs, window functions, performance improvement
- Python - pandas, scikit-learn, pyspark
- Working experience on big data/cloud platforms - Databricks, H2O, AWS

## Work Experience

### Axtria - Ingenious Insights

Berkeley Heights, NJ

SENIOR DECISION SCIENTIST (R&D)

2020 - Present

- Innovated a lookalike model to make it much faster to run, easier to interpret and yield better prediction performance all at the same time. This new method has been well appreciated and adopted by the Axtria team and leadership. It is being used to tackle problems across patient analytics, physician analytics, and hospital analytics.
- Solved the long-lasting memory issue of a machine learning based patients-lookalike process by implementing a generic map-reduce strategy in R. With this improvement, our group is now able to run multiple data-intensive consulting projects on the same server, saving the client a tremendous amount of time and cloud infrastructure cost.
- End-to-end automated several payer-stream standard reports for Pharma B using R Shiny. For some of the reports, the refreshing time has been reduced from hours to minutes. Other reports even begin to “breathe” on their own such that no more human intervention will ever be needed. Our clients told us they loved these reports because they are not only automated but also improved with more concise and cleaner KPI representations. These positive changes enabled our clients to make quicker and smarter decisions.
- Developed a set of R packages for Pharma B, facilitating new members to pick up work quickly. For example, these packages enabled us to connect to databases, pull up commonly used SQL snippets, refresh standard reports, generate beautiful dashboards, and make use of third-party APIs with single lines of code. These packages have been helping us stay away from repetitive tasks and focus on more creative ones.
- Improved the performance and user experience of a legacy payer-contracting software, written in R Shiny and SQL, by adding custom R packages as patches, refining the underlying infrastructure, and introducing new features. All client complaints went away after these changes.
- Developed an NLP application in R to help Pharma C's HR department identify risky items.

## Axtria - Ingenious Insights

Berkeley Heights, NJ

SENIOR DECISION SCIENTIST (CONSULTING)

2020 - Present

- Secured a new brand supporting project for Axtria from Pharma A by demonstrating extensive analytical skills and experiences.
- Coordinated with teams across different organizations and time zones to define the market of the new brand for Pharma A.
- Led payer-stream consulting efforts for Pharma B. Timely responded to big volumes of client requests, effectively communicated with clients to understand underlying business problems, proactively cleared roadblocks and assigned tasks to offshore colleagues to form a seamless global workflow, quickly took feedback from clients and iterated, and delivered satisfactory results either on time or ahead of time.
- Kept team members working effectively with rational workload-control techniques. Broke client requests into actionable sub-tasks and prioritized them by importance and deadlines. Released only bottleneck sub-tasks to only team members who had the bandwidths. Managed client expectations and re-prioritized ongoing requests when the team was working at its full capacity, protecting team members' mental health and creativity, resulting in high-quality deliverables that clients appreciated.
- Collaborated with Axtria teams and successfully delivered a Physicians & Hospitals Segmentation consulting project to Pharma B. Learned all aspects of Life Sciences commercial segmentation practices from Axtria team members and clients.
- Internal consulting, such as sub-national forecasting, doctor market access scoring, account manager allocation, and RStudio Server setup.
- Worked on a wide variety of Life Sciences projects, for example, doctors and hospitals segmentation and targeting, promotional response modeling, marketing mix optimization, patient analytics such as patient journey analysis and potential patients identification, market access analytics such as payer-plan segmentation, contracting and rebate optimization, and payer favorability modeling.
- Helped to cultivate a data-centric culture within Axtria by recommending resources on data science, AIML, and software engineering.
- Extensive knowledge of commercial Life Sciences data sets, such as IQVIA NSP, DDD, Xponent (PlanTrak), NPA, LAAD, and Veeva promotionals.

## Academic Research

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### The Pennsylvania State University

University Park, PA

GRADUATE RESEARCH ASSISTANT

2016 - 2020

- Developed a set of algorithms to compute nonparametric and distribution-free confidence regions on the optima of multi-dimension functions fitted from data, and (non)parametric Bayesian credible regions on the same. The accompanying R package, OptimaRegion, has been used by nearly 20,000 users worldwide to this date. These algorithms also have the potential to systematically solve the hyperparameter tuning problem in the machine learning field.
- Investigated the United States IEOR faculty hiring network with a latent variable exponential random graph model.
- Applied statistical process control and shape analysis to point-cloud data to improve the quality of 3D-Printing products.

### University of Missouri - Columbia

Columbia, MO

GRADUATE RESEARCHER

2014 - 2015

- Formulated the Toyota Kanban production system as a Markov Chain and maximized its profits using the Simulated Annealing Algorithm.
- Built a sales transaction database for a medical equipment company in Shanghai, China.

## Teaching

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### The Pennsylvania State University

University Park, PA

INSTRUCTOR OF STOCHASTIC MODELS IN OPERATIONS RESEARCH (IE 425)

2019 - 2020

- Independently developed lectures, computer simulations, homework assignments, and exams.
- Worked with a teaching assistant and a grader to serve 132 undergraduate students of this core IE course.
- Learned how to explain things in the easiest way possible.

### The Pennsylvania State University

University Park, PA

TEACHING ASSISTANT OF ENGINEERING ECONOMICS (IE 302)

2015 - 2016

- Helped the instructor to teach cash flow analysis and project valuations.
- Held office hours and review sessions, and graded homework assignments and exams.

## Publications

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- Chen, P., & Castillo, E. del. (2021). On inferences about the location of response surface optima based on a latent spatial process (under revision). *Journal of Statistical Computation and Simulation*.
- Castillo, E. del, Chen, P., Meyers, A., Hunt, J., & Rapkin, J. (2020). Confidence regions for the location of response surface optima: The r package OptimaRegion. *Communications in Statistics-Simulation and Computation*, 1–21.
- Castillo, E. del, Chen, P., Meyers, A., Hunt, J., & Rapkin, J. (2019). OptimaRegion: Confidence regions for optima. [CRAN.R-project.org/package=OptimaRegion](https://CRAN.R-project.org/package=OptimaRegion).
- Castillo, E. del, Meyers, A., & Chen, P. (2020). Exponential random graph modeling of a faculty hiring network: The IEOR case. *IIE Transactions*, 52(1), 43–60.