



Career Paths in Applied Mathematics



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What is Applied Mathematics?

- ▶ **Applied mathematics** is the application of mathematical methods by different fields such as physics, engineering, medicine, biology, finance, business, computer science, social sciences, government, and industry.
 - Applied mathematics is a combination of mathematical science and specialized knowledge (application).
- ▶ Use theories and techniques, such as **mathematical modeling** and **computational methods**, to formulate and solve problems in the different fields listed above.

Sources:

<https://www.sjsu.edu/math/student-resources/advising/mathematical-careers.php>

https://en.wikipedia.org/wiki/Applied_mathematics



What can I do with an applied math degree?

- ▶ Mathematics and computational science are utilized in almost every discipline of science, engineering, industry, and technology.
- ▶ What kinds of problems might you work on?
- ▶ While careers in mathematics may differ widely by discipline and job title, one thing remains constant among them — **problem solving**.

Source:

<https://www.siam.org/students-education/programs-initiatives/thinking-of-a-career-in-applied-mathematics>

HERE ARE SOME EXAMPLES OF ORGANIZATIONS THAT HIRE MATHEMATICIANS AND COMPUTATIONAL SCIENTISTS:

- ACADEMIC INSTITUTIONS AND RESEARCH INSTITUTES
- AEROSPACE AND TRANSPORTATION EQUIPMENT MANUFACTURERS OR SERVICE PROVIDERS
- ANALYTICS AND FORECASTING ORGANIZATIONS
- CHEMICAL OR PHARMACEUTICAL MANUFACTURERS
- COMMUNICATIONS SERVICES PROVIDERS
- COMPUTER INFORMATION AND SOFTWARE FIRMS; ESTABLISHED OR START-UPS
- CONSUMER PRODUCTS COMPANIES
- ENERGY SYSTEMS FIRMS
- ELECTRONICS AND COMPUTER MANUFACTURERS
- ENGINEERING RESEARCH ORGANIZATIONS
- FINANCIAL SERVICE AND INVESTMENT MANAGEMENT FIRMS
- GOVERNMENT LABS, RESEARCH OFFICES AND AGENCIES
- INSURANCE COMPANIES
- MEDICAL DEVICE COMPANIES
- PRODUCERS OF PETROLEUM AND PETROLEUM PRODUCTS

POSSIBLE JOB TITLES FOR PEOPLE WITH APPLIED MATH & COMPUTATIONAL SCIENCE BACKGROUNDS AND EDUCATION:

- Actuary
- Analyst
- Analytics Consultant
- Analytics Manager
- Applied Mathematics Researcher
- Associate Editor
- Biostatistician
- Business Analyst
- Business Intelligence Developer
- Claims Specialist
- Consultant
- Cryptanalyst
- Cryptographer
- Data Analyst
- Data Engineer
- Data Operations Associate
- Data Processing Specialist
- Data Scientist
- Director of Math Tutorial Curriculum
- Engineer
- Forecast Analyst
- Functional Analyst
- Game designer/slot game designer/game mathematician
- Geolocation Engineer
- Global Pricing Analyst
- Guidance and Navigation Engineer
- Informatics Scientist
- Information Analyst
- Investment Analytics Quant
- Manager
- Math Curriculum Coach
- Math Curriculum Consultant
- Mathematician
- Modeler
- Modeling Engineer
- Operations Researcher
- Operations Support Specialist
- Pharmacokineticist
- PK/PD Modeler
- Planner
- Principal Scientist
- Product Manager
- Program Manager
- Programmer
- Project Manager
- Quality Systems and Compliance Manager
- Quantitative Analyst
- Quantitative Developer
- Quantitative Pharmacologist
- Quantitative Researcher
- Quantitative Scientist
- Quantitative Software Engineer
- Reporting Engineer
- Research and Development Engineer
- Research Analyst
- Researcher
- Research Scientist
- Risk Analyst
- Risk Strategist
- Scientist
- Simulation Engineer
- Software Engineer
- Staff Scientist
- Statistician
- Strategist
- Supply Chain Analyst
- Systems Engineer
- Technical Staff
- Tutor



Some applications to work on...

- ▶ How can an **airline** use smarter scheduling to reduce costs of aircraft parking and engine maintenance? Or smarter pricing to maximize profit?
- ▶ How can **automotive and aircraft companies** test performance, safety, and ergonomics, while at the same time lowering the cost of construction and testing prototypes?
- ▶ A **pharmaceutical company** wants to search a very large database of proteins to find one that is similar in shape / activity to one they have discovered. What's the most efficient way to do so?
- ▶ How do we use major advances in computing power to incorporate knowledge about interactions between the **oceans, the atmosphere and living ecosystems** into models used to predict long-term change?
- ▶ How might **disease spread** in populated areas in the event of a bioterrorism event, and how would it be contained?
- ▶ Can we measure sentiment change as a result of **social media** shares, likes and comments?
- ▶ How can you allocate an **investment** among various financial instruments to meet a risk/reward trade-off?



Some applications to work on...

- ▶ Can mathematical models be coupled with efficient computational implementations to obtain practical, low-cost simulations to guide **computer chip design and manufacture**?
- ▶ How can genome sequencing analysis help in making clinical decisions based on a **personalized medicine** approach?
- ▶ How can mathematics improve rating prediction performance of **e-commerce systems** and help enhance the consumer experience based on their past purchases, behavior and interests?
- ▶ Can we provide insight to **coastal communities** about future sea level rise and the risk and likelihood of effects of climate related events on their communities?
- ▶ How can you mathematically model the **spread of a forest fire** depending on weather, ground cover and type of trees?
- ▶ How do you design a **robotic hand** to grip a coin and drop it in a slot?



Former students & colleagues with applied math degrees have jobs at:

- ▶ Academic institutions
- ▶ K-12 math teacher
- ▶ Google; Apple; Yahoo
- ▶ Boeing
- ▶ NSA (National Security Agency)
- ▶ Las Alamos National Lab
- ▶ FDA (US Food and Drug Administration)
- ▶ USDA (US Dept of Agriculture)
- ▶ Pfizer; Norvartis; Eli Lilly
- ▶ Wall street jobs
- ▶ Credit One Bank, Las Vegas
- ▶ Medical Information Bureau, NYC
- ▶ NV Dept of Health and Human Services
- ▶ Nevada Central Cancer Registry (NCCR)
- ▶ NV Energy
- ▶ Volvo IT
- ▶ Stitch Fix
- ▶ LinkedIn
- ▶ 3M



Former students & colleagues with applied math degrees have jobs at:

- ▶ Renown – health data analytics
- ▶ Gaming industry: IGT, Peppermill, Light and Wonder
- ▶ Investment banking – data analysis, strategy
- ▶ Climate modeling
- ▶ Jobs in Data Science; Machine Learning, AI, experimentation
- ▶ Consulting
- ▶ Lawyer