

Paul C. Kainen, Ph.D

Mathematics, technology, and visual perception

Cornell University, 1970, in Topology
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Georgetown University
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Visiting Associate/Adjunct Associate Professor, Georgetown University, 1997–present

Consultant in Mathematics and Technology, Washington, DC, 1988–1997

System Engineer and Consultant, The Analytic Sciences Corp., McLean, VA, 1983–1988

President, Laser Arts, New York, NY, 1981–1983

Member of Technical Staff, Bell Telephone Laboratories, Holmdel, NJ, 1977–1981

Assistant/Associate Professor, Case Western Reserve University, Cleveland, OH, 1970–1977

Georgetown University: teaching and research

- Taught graph theory, combinatorics, number theory, topology, category theory, neural networks, and mathematical models in biology, as well as calculus and statistics.
- Supervision of undergraduate honors-theses and class projects. Member of the Center for the Brain Basis of Cognition and of the Steering Committee for the Interdisciplinary Program in Cognitive Science; gave courses and modules for the Program, including the demonstration of psychophysical displays using lasers and computers.
- Research on the mathematical theory of neural networks and nonlinear approximation, including several published papers coauthored with Dr. A. Vogt, Chair of our department and V. Kůrková, Head of the Department of Theoretical Computer Science of the Czech Academy of Sciences. Obtained COBASE support from the National Academy of Sciences of the USA for Dr. Kůrková to visit Georgetown for research.
- Invited speaker at conferences in neural networks, graph theory, category theory, and philosophy; reviewer for J. of Graph Theory and Brain and Behavioral Science.
- Collaborative research grant provided by Georgetown University, Office of International Programs, enabling several trips to Italy. Departmental support for additional travel to various conferences in the U.S. and in Europe.
- Organized two interdisciplinary conferences at Georgetown on Topology in Biology, 1998 and 2004. Speakers included Cozzarelli, Sumners, Stadler, and Glass. Created Laboratory for Psychophysics and Mathematical Visualization.
- Mentor for the John Carroll Scholars Program and for a high-school student.

Consulting in mathematics and technology, 1988–1997:

- Optical communications network design using infrared and visible lasers.
- Telecommunications in various industries, especially wide-band applications in the petro-chemical and automotive sectors, Ditberner and Associates, Bethesda, MD.
- Technology strategy with respect to telecommunications and the internet; trained groups for the Red Cross, the Corporation for Public Broadcasting, and the U.S. Information Agency with regard to the internet. Also gave paid tutorials on internet during trade shows and conferences. Kainen Technology Services, Washington, DC.
- Lectured on mathematics at Smithsonian and Johns Hopkins; Organized lecture and demo series for Smithsonian Institution, including Advanced Computing, Intelligent Systems, and Multimedia with Brooks, Zadeh, Holland, Cantor, Schlichting, et al.

System engineering, TASC, 1983–1988:

Artificial intelligence, neural networks, and object-oriented software in the context of digital cartography. Planning the automation of office and industrial processes. Computer-aided drafting of engineering flowcharts (large multi-color documents drawn on a flatbed plotter using AutoCAD). I was responsible for the design and implementation of this system, which included a macro-driven tablet menu for operation by less skilled personnel.

Laser system design and utilization, Laser Arts, 1981–1983:

Graphical displays for advertising and entertainment using low and medium power lasers and optical modulation. Analysis of lighting and cable TV network design for buildings.

Research on telecom and human-computer interaction, Bell Labs, 1977–1981:

Deployment plan for new technology which was efficient and easy to implement. Implications of visual psychophysics for computer use and telecommunications demand. Mathematical theory of heuristics based on topology. Laser display demo at AAAS Houston.

Teaching and Research, Case Western Reserve University, 1970–1977:

Undergraduate and graduate teaching; thesis-advisor for three Ph.D.s; 3-year NSF Grant (as Principal Investigator). Worked with Systems Research Center (Mesarovic), computer science, operations research, biology, and medical school at Case. Consultant for Wharton School. Worked with Saaty in applying the analytic hierarchy method for prioritization of transportation projects in Sudan. Research in graph theory and algebraic topology.

Extras: Member: Washington Evolutionary Systems Society and Forum on Psychiatry and the Humanities. My work is cited in graph drawing, RNA folding, and neural network literatures; my Erdős number is 1. Son of painter and grandson of inventor.