Stephen V. Rice, Ph.D.

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Dr. Stephen V. Rice has developed software systems that are popular (used by millions of people), long lasting (used for more than 20 years), and pioneering, with innovations in pattern recognition and artificial intelligence (AI); database systems and search technology; and computer algorithms. His work in AI has spanned 35 years.

Experience

- Computer scientist, software engineer and architect
- Pattern recognition, machine learning, artificial intelligence
- Efficient algorithms and data structures for processing "big data"
- Database systems, search engines, data mining
- Programming language design, compiler construction
- User interface design
- Audio algorithms and systems; audio comparison, search, and visualization
- Optical character recognition, image processing
- Simulation and modeling
- Computational biology, bioinformatics, sequence alignment algorithms
- Parallel processing, multithreading, distributed systems
- Mathematics, probability and statistics
- High-quality, readable and maintainable software
- C++, Java, Python, Windows, Unix/Linux, SQL, TCP/IP, etc.

Education

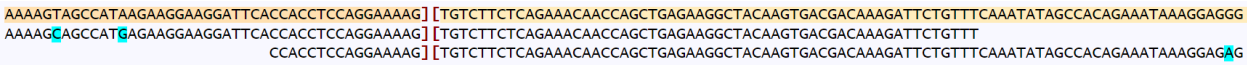
- Ph.D. in Computer Science, University of Nevada, Las Vegas (UNLV), 1996
- M.S. in Computer Science, University of Illinois at Urbana-Champaign, 1981
- B.S. in Mathematics, Western Michigan University, 1979

Work History

- Software development: St. Jude Children's Research Hospital (since 2015), Comparisonics, UNLV, CACI, Oracle (40th employee), IBM
- Computer science professor: University of Mississippi, San Juan College

Innovations

- Genomics software for finding structural variants in DNA and RNA data, used in cancer research and diagnosis; see, for example, *Fuzzion2* at GitHub (link)



- FindSounds.com, the leading web search engine for sound effects since 2000 (link)
- *FindSounds Palette*, a state-of-the-art audio database system
- *FindSounds for Android*, the first mobile app for audio web search
- "Sound-matching" algorithm for computer perception of sound and content-based retrieval
- Comparisonics colored waveform display, patented invention for visualizing audio

- Book on optical character recognition (OCR) depicting sources of error in character recognition; this book influenced the development of CAPTCHAs
- Software toolset (link) and methodology for measuring the accuracy of OCR systems using sequence-comparison algorithms, and doctoral dissertation on the subject (pdf)
- The UNLV Annual Tests of OCR Accuracy (1992-1996), the first large-scale independent evaluations of commercial OCR systems
- A "voting" OCR system (1991), which combined existing OCR systems by taking a majority vote to improve accuracy, an early example of ensemble learning

- Object-oriented extensions to the Simscript programming language (in collaboration with Nobel laureate Harry M. Markowitz)
- The Modsim object-oriented programming language for computer simulation
- Simscript and Modsim APIs for portable graphics, animation, and graphical user interfaces (1989), which pre-dated Java and Flash by six years
- Modsim implementation of neural networks for deep learning (1989)

- *TED* (1983), the first-known table editor for relational databases
- Oracle's first SQL pre-compiler (1982)

- Novel bootstrap and loader for a check-sorting computer, for Burroughs Corp. (1978)

Selected Publications (see Google Scholar for complete list: link)

- Books
  - S.V. Rice, G. Nagy, and T.A. Nartker, *Optical Character Recognition: An Illustrated Guide to the Frontier*, Kluwer Academic Publishers, Norwell, MA, 1999 (link)
  - R. Belanger, B. Donovan, K. Morse, S. Rice, and D. Rockower, *Modsim: A Language for Object-Oriented Simulation*, CACI Products Company, La Jolla, CA, 1989

- Patent
  - S.V. Rice and M.D. Patten, *Waveform Display Utilizing Frequency-Based Coloring and Navigation*, U.S. patent no. 6,184,898, Patent and Trademark Office, Washington, DC, 2001 (link)

- Journal articles
  - S. Newman, L. Fan, A. Pribnow, A. Silkov, S.V. Rice, et al., "Clinical Genome Sequencing Uncovers Potentially Targetable Truncations and Fusions of *MAP3K8* in Spitzoid and Other Melanomas," *Nature Medicine*, 25(4), 2019 (link)
  - S.V. Rice, H. Bunke, and T.A. Nartker, "Classes of Cost Functions for String Edit Distance," *Algorithmica*, 18(2), 1997 (link)
  - J. Kanai, S.V. Rice, T.A. Nartker, and G. Nagy, "Automated Evaluation of OCR Zoning," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 17(1), 1995 (link)

- Conference papers
  - S.V. Rice and S.M. Bailey, "A System for Searching Sound Palettes," in *Proceedings of the Eleventh Biennial Symposium on Arts and Technology*, New London, CT, 2008 (pdf)
  - S.V. Rice, "Braided AVL Trees for Efficient Event Sets and Ranked Sets in the Simscript III Simulation Programming Language," in *Proceedings of the International Conference on High Level Simulation Languages and Applications*, San Diego, CA, 2007 (pdf)
  - S.V. Rice, A. Marjanski, H.M. Markowitz, and S.M. Bailey, "The Simscript III Programming Language for Modular Object-Oriented Simulation," in *Proceedings of the 2005 Winter Simulation Conference*, Orlando, FL, 2005 (pdf)
  - S.V. Rice, "Frequency-Based Coloring of the Waveform Display to Facilitate Audio Editing and Retrieval," in *Proceedings of the 119th Convention of the Audio Engineering Society*, Paper #6530, New York, 2005 (pdf)
  - S.V. Rice and S.M. Bailey, "A Web Search Engine for Sound Effects," in *Proceedings of the 119th Convention of the Audio Engineering Society*, Paper #6622, New York, 2005 (pdf)
  - S.V. Rice and S.M. Bailey, "General-Purpose Real-Time Monitoring of Machine Sounds," in *Essential Technologies for Successful Prognostics: Proceedings of the 59th Meeting of the Society for Machinery Failure Prevention Technology*, Virginia Beach, VA, 2005 (pdf)
  - S.V. Rice, F.R. Jenkins, and T.A. Nartker, "The Fifth Annual Test of OCR Accuracy," presented at the Fifth Annual Symposium on Document Analysis and Information Retrieval, Las Vegas, NV, 1996 (pdf)