

## 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, Linux, Windows, SQL, 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 (40<sup>th</sup> employee), IBM
- Computer science professor: University of Mississippi, San Juan College

See [chronology](#). Currently, Principal Software Engineer at St. Jude Children’s Research Hospital.

## Innovations

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

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AAAAGTAGCCATAAGAAGGAAGGATTCCACACCTCCAGGAAAAG [TGTCTTCTCAGAAACAACCAGCTGAGAAGGCTACAAGTGACGACAAAGATTCTGTTTCAAATATAGCCACAGAAATAAAGGAGGG  
AAAAGCAGCCATGAGAAGGAAGGATTCCACACCTCCAGGAAAAG [TGTCTTCTCAGAAACAACCAGCTGAGAAGGCTACAAGTGACGACAAAGATTCTGTTT  
CCACCTCCAGGAAAAG [TGTCTTCTCAGAAACAACCAGCTGAGAAGGCTACAAGTGACGACAAAGATTCTGTTTCAAATATAGCCACAGAAATAAAGGAGAG
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- [FindSounds.com](#), the leading web search engine for sound effects since 2000
- [FindSounds Palette](#), a state-of-the-art audio database system
- [FindSounds for Android](#), the first mobile app for audio web search
- AI algorithm for computer perception of sound and content-based audio retrieval
- [Comparisons 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](#) and methodology for measuring the accuracy of OCR systems using sequence-comparison algorithms, and [doctoral dissertation](#) on the subject
- The UNLV Annual Tests of OCR Accuracy (1992 to 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 in AI
- Object-oriented extensions to the [Simscrip](#)t simulation programming language (in collaboration with Nobel laureate Harry M. Markowitz)
- The Modsim object-oriented simulation programming language
- Simscrip and Modsim APIs for portable graphics, animation, and graphical user interfaces (1989)
- Modsim implementation of neural networks for deep learning (1989)
- Oracle’s first SQL pre-compiler (1982)

## Selected Publications ([complete list](#) at Google Scholar)

- 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
  - 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
- Journal articles
  - S.V. Rice, M.N. Edmonson, X. Chen, R. Greenhalgh, et al., [Fast and Sensitive Detection of Targeted Gene Fusions Using Frequency Minimizers and Fuzzy Pattern Matching with Fuzzion2](#), *Cell Reports Methods*, 5(12), 2025
  - 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
  - S.V. Rice, H. Bunke, and T.A. Nartker, [Classes of Cost Functions for String Edit Distance](#), *Algorithmica*, 18(2), 1997
  - 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
- 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
  - 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
  - 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
  - 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
  - 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
  - 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
  - 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

Also, more than 180 articles on baseball history, see [list](#).