

# NOAH S. FRIEDLAND, PH.D.

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## OBJECTIVE

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To help my clients develop and implement research programs and strategies that support their long term business goals.

## SKILLS

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- Twenty years of system and technology research and development
- Five years of research program management for government and industrial clients
- Demonstrated ability to identify and define critical research agendas, and form teams and strategies to attack them
- Demonstrable ability to manage diverse, large-scale, distributed research efforts and teams
- Proven ability to develop funding in academic, government and private settings
- Excellent communications skills written and oral, with demonstrable track record of peer-reviewed scientific publications and presentations

## CAREER SUMMARY

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1. January 2007 – Present, *President, The Friedland Group, Inc.* Overseeing year 2 of Möbius (Learning by Reading) demonstration platform development. Leading an effort (via CACI, on behalf of DARPA) with the participation of SRI International (Lead contractor), The University of Texas, Austin, USC's ISI, Boeing, and BBN, to develop two demonstration systems. Milestone A (6 months) will involve enhanced question-answering capabilities and better feedback between the Natural Language Understanding (NLU) and Knowledge Representation and Reasoning (KR&R) components of the Möbius system. Milestone B (12 months) will provide the ability to target new texts to fulfill learning objectives, as well as enhanced abilities to correct errors and manage uncertainty.
2. March 2005 – December 2006, *CACI Consultant on behalf of DARPA.* Engagement has involved three distinct phases:
  - March 2005 – July 2005: Identify potential high-impact research opportunities through dozens of interviews with leading researchers in various areas of Artificial Intelligence and a large one-day workshop hosted in Seattle
  - July 2005 – April 2006: Conduct a feasibility study of 'Learning by Reading' (LbR) – a technology that would enable the formulation of large, robust and evolving knowledge bases by acquiring knowledge from texts. Assembled a team of 20 researchers, led by SRI International to investigate how KR&R, NLU and Machine Learning (ML) techniques might be integrated to achieve LbR.
  - May 2006 – December 2006: Develop a prototype to demonstrate learning by reading through a simple experiment. Selected SRI International, USC's ISI and University of Texas at Austin to develop an LbR prototype that will demonstrate a system that is capable of learning about the form and function of a human heart. Based upon the outcome of this demonstration, the Director of DARPA approved another 12 months of system development work.
3. May 2002 – October 2004, *Project Halo Program Manager, Vulcan Inc.* Developed Project Halo [www.projecthalo.com](http://www.projecthalo.com), a multi-million dollar R&D effort to develop an artificial intelligence platform to support science and education. Oversaw the pilot phase, which developed a new methodology to evaluate KR&R systems. And led the design phase of stage 2 – an effort to develop tools that would allow scientists and scientific educators to formulate and maintain large, high performance knowledge bases.
4. February 2001-September 2001 (reduction in force), *Principal Engineer, Asta Networks.* Development of several product prototypes: architected, designed and developed a distributed bandwidth management application to enable XSP customers to remotely manage bandwidth on enterprise facing edge routers. Also constructed a router policy performance testbed and methodology to study the performance impact of denial of service countermeasures and quality of service policies on router performance. (CISCO IOS, Postgres, Tcl, Linux).

5. June 1999-February 2001, *Founder, President and CEO of Tahajo Technologies*. Formed Tahajo Technologies, taking its massively scalable collaborative e-commerce application from concept stage, through company formation, seed financing and staffing, product specification and five full development cycles. Architected, performed data and object modeling and design, and implemented alpha versions of the product(s). Built a highly capable tech team, and through an extremely focused effort was able to roll out three complex, innovative enterprise applications in less than 9 months. Authored and managed a comprehensive technology patent. (Java, Servlets, Apache, Oracle, Tomcat, XML, Linux).
6. October 1998 – May 1999, *Director Research and Development, LiveBid.com*. Architected, authored the patent and led the development of LiveBid.com's second-generation massively scalable live auction platform. This included product and feature specification, architecture, object and data modeling, design and implementation of the underlying messaging infrastructure, client and server components. This technology powered Buterfield's O.J. Simpson auction, which led to LiveBid's acquisition by Amazon in May 1999 (Java, Oracle, ObjectStore).
7. June 1997 – August 1998, *Senior Software Engineer, University of Washington*. Architected, designed and developed several turnkey Internet applications for King County Metro and the Washington State Department of Transportation, including Buslink (TransitWatch), TDAD and the MDI Backbone (self describing data). TransitWatch combined schedule information, real-time vehicle location data and a predictive algorithm to create online performance reports for the riding public. (Java, Oracle)
8. October 1993 - June 1997, *Research Engineer, Lockheed Martin Astronautics, Denver*. Conducted Research and Development against a variety of Defense Advanced Research Project Agency (DARPA) projects in conjunction with the USAF. Developed a target recognition system for detecting and identifying military vehicles. Strong pattern recognition elements. Developed a distributed data-mining tool that enabled creation of shared annotated views for sensitive data. Developed a distributed testbed environment for multi-tasking a server farm to run performance and stress analysis of a complex recognition system. Computer Vision and Image Processing, target and pattern recognition (C, Perl, Java)
9. August 1988 - May 1993, *Graduate Research Assistant, Center for Automation Research, University of Maryland, College Park*. Conducted research into optimization-based image understanding and image processing. Discovered that integrating several collaborative intelligent "agents" into a single optimization process yielded superior results over systems with sophisticated functional operators that did not collaborate (C)
10. September 1990 - January 1993, *Consultant, NASA Goddard Space Flight Center. Atmospheric Sciences*. Developed Optimization-based temperature analysis application (C)
11. October 1986 – August 1988, *Graduate Assistant, Electrical Engineering Department, Technion, Israel Institute of Technology*. Developed an optimization-based algorithm for automatic detection of ventricle boundaries in time sequential echocardiography.

#### EDUCATION SUMMARY

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1993 – Ph.D., Computer Science, University Of Maryland at College Park.

1988 – M.Sc. EE, Technion, Israel Institute of Technology, Haifa, Israel.

1986 – B.Sc., Aeronautical Engineering, Cum Laude, Technion, Israel Institute of Technology, Haifa, Israel.

#### SELECT PUBLICATIONS

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1. N. S. Friedland et al., "Project Halo: Towards a Digital Aristotle," AI Magazine, Winter 2004 Edition.
2. N. S. Friedland et al., "Towards a Quantitative, Platform Independent Analysis of Knowledge Systems," Proceedings, KR 2004, Whistler.
3. N. S. Friedland and A. Rosenfeld, "An Integrated Approach to 2D Object Recognition," Pattern Recognition, Vol. 30, No. 3, March 1997.
4. N. S. Friedland, "Feature Characterization in the Context of Model-Based Search," Proceedings, SPIE Algorithms for Synthetic Aperture Radar Imagery III, Vol. 2757, pp. 253-270, April 1996.
5. N. S. Friedland and B. J. Rothwell, "A PTBS Segmentation Scheme for Synthetic Aperture Radar," Proceedings, SPIE Signal Processing, Sensor Fusion, and Target Recognition IV, Volume 2484, pp. 476-493, Orlando, FL, April 1995.
6. N. S. Friedland, S. D. Raney and B. J. Rothwell, "Model Based Vision Using Integrated Resource Architecture," Proceedings of the Automatic Target Recognizer Systems and Technology Conference IV, Monterey, CA, November 1994.
7. S. D. Raney, N. S. Friedland, J. N. Record and A. R. Nowicki, "Fine Identification of Targets & Evidence Accrual in the ARAGTAP Testbed," to appear, Proceedings of the Automatic Target Recognizer Systems and Technology Conference IV, Monterey, CA, November 1994.

8. N. S. Friedland, "An Integrated Approach to Object Recognition," pp. 777-787, 1993 DARPA IU workshop, Washington D.C.
9. N. S. Friedland, "Utilizing Energy Function and Description Length Minimization for Integrated Delineation, Representation and Classification of Objects," Ph.D. Thesis, University of Maryland, 1993.
10. N. S. Friedland and A. Rosenfeld, "Compact Object Recognition Using Energy Function Based Optimization," IEEE Trans. Pattern Anal. Machine Intell., Vol. 14, No. 7, pp. 770-777, July 1992.
11. N. S. Friedland, "A Markov Random Field/Accumulator Sampler Approach to the Atmospheric Temperature Inversion Problem," NASA, Center for Excellence in Space Data Information Sciences (CESDIS) TR 83-92.
12. N. S. Friedland and D. Adam, "Automatic Cavity Boundary Detection from Sequential Ultrasound Images Using Simulated Annealing," IEEE Trans. Medical Imaging, Vol. 8, pp. 344-353, Dec. 1989.

#### INVITED TALKS

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1. N. S. Friedland et al., "Project Halo: Towards a Digital Aristotle," IAAI, IJCAI 2003, Acapulco, Mexico
2. N. S. Friedland et al., "Project Möbius," AAAI SSS2007, Stanford, CA

#### PATENTS

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Noah S. Friedland, Sky T. Kruse "Distributed Live Auction," 6,449,601