

Dr. Noah B. Jacobsen

Curriculum Vitae

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Mission Solutions Group
Director of Data Science
njacobsen@msg.us.com

Aquerre Technologies
Chief Executive Officer
noah@aquerre-technologies.com

<https://missionsolutionsgroup.com> <https://aquerre-technologies.com>

SUMMARY

- Current Director of Data Science at Mission Solutions Group, Inc.
- Expert in information and probability theory, inference on graphs, Machine Learning (ML) and Artificial Intelligence (AI) algorithms and architectures
- Principal Investigator (P.I.) on USSOCOM Phase II SBIR, “Platform Agnostic Data Storage Infrastructure,” leading a joint team from MSG and MIT Lincoln Laboratory – Phase II completed 2021, currently pursuing Phase III
- Subject Matter Expert (SME) on industry/Government thought leadership and policy programs on AI/ML technology, including the SOFWERX Rapid Integration of AI Program
- Performer of research and development and consulting services on Government contracts and grants for 20 years
- Proven leader with experience in Government, industry and academic sectors
- Founder of Aquerre Technologies

SECURITY CLEARANCE

- Department of Defense (DoD) Top Secret Clearance (Active)

U.S. PATENTS

- [1] N. B. Jacobsen. Supervised Graph Learning. U.S. Patent Application No. 17/718,787, Mission Solutions Group, Apr. 2022.
- [2] N. B. Jacobsen and R. Soni. Method and system for encoding data using rate-compatible irregular LDPC codes based on edge growth and parity splitting. U.S. Patent No. 7,966,548, Alcatel-Lucent Bell Labs, June 2011.

PH.D. DISSERTATION

- [1] N. B. Jacobsen. *Bayesian approaches to noncoherent communication: From Shannon theory to practical architectures*. PhD thesis, University of California, Santa Barbara, Dept. of Electrical and Computer Engineering, 2005.

BOOK CHAPTERS

- [1] G. Barriac, N. B. Jacobsen, and U. Madhow. *Space-time wireless systems: From array processing to MIMO communications*, chapter 5: The role of feedback, CSI and coherence in MIMO systems. Cambridge University Press, 2006.

JOURNAL PAPERS

- [1] N. B. Jacobsen and U. Madhow. Coded noncoherent communication with amplitude/phase modulation: From Shannon theory to practical turbo architectures. *IEEE Trans. Commun.*, 56(12), Dec. 2008.
- [2] N. B. Jacobsen, G. Barriac, and U. Madhow. Noncoherent eigenbeamforming and interference suppression for outdoor OFDM systems. *IEEE Trans. Commun.*, 56(6), June 2008.
- [3] K. Solanki, N. B. Jacobsen, U. Madhow, B. S. Manjunath, and S. Chandrasekaran. Robust image-adaptive data hiding using erasure and error correction. *IEEE Trans. Image Processing*, 13(12):1627–1639, Dec. 2004.

CONFERENCE PAPERS

- [1] N. B. Jacobsen. Reverse Engineering the Hamming Code with Automatic Graph Learning. In *Proc. Intern. Conf. on Artificial Intelligence in Information and Communication (ICAIIC)*, Jeju Island, Korea, Apr. 2021.
- [2] N. B. Jacobsen. Practical cooperative coding for half-duplex relay channels. In *Proc. Conf. on Inform. Sciences and Systems (CISS)*, Baltimore, MD, USA, Mar. 2009.

- [3] N. B. Jacobsen and R. Soni. Design of rate-compatible irregular LDPC codes based on edge growth and parity splitting. In *Proc. IEEE Veh. Tech. Conf. (VTC)*, Baltimore, MD, USA, Sept. 2007.
- [4] N. B. Jacobsen, G. Barriac, and U. Madhow. Noncoherent eigenbeamforming for a wideband cellular uplink. In *Proc. IEEE Intern. Symp. on Inform. Theory (ISIT)*, Chicago, IL, USA, June 2004.
- [5] N. B. Jacobsen, G. Barriac, U. Madhow, R.-R. Chen, and R. Koetter. Towards Shannon-theoretic limits on wireless time-varying channels. In *Proc. International Symp. on Control, Communications, and Signal Processing (ISCCSP)*, Hammamet, Tunisia, Mar. 2004.
- [6] N. B. Jacobsen and U. Madhow. Code and constellation optimization for efficient noncoherent communication. In *Proc. Asilomar Conf. on Signals, Systems, and Computers*, Monterey, CA, USA, Nov. 2004.
- [7] N. B. Jacobsen G. Barriac and U. Madhow. Wideband space-time communication: from propagation-based models to information-theoretic design prescriptions. In *Proc. IEEE Intern. Conf. on Signal Processing and Communications*, Bangalore, India, Dec. 2004.
- [8] N. B. Jacobsen and U. Madhow. Reduced-complexity noncoherent communication with differential QAM and iterative receiver processing. In *Proc. Conf. on Inform. Sciences and Systems (CISS)*, Baltimore, MD, USA, Mar. 2003.
- [9] N. B. Jacobsen, K. Solanki, S. Chandrasekaran, U. Madhow, and B. S. Manjunath. Image adaptive high volume data hiding based on scalar quantization. In *Proc. IEEE Military Comm. Conf. (MILCOM)*, Anaheim, CA, USA, Oct. 2002.
- [10] K. Solanki, N. B. Jacobsen, S. Chandrasekaran, U. Madhow, and B. S. Manjunath. High-volume data hiding in images: Introducing perceptual criteria into quantization based embedding. In *Proc. ICASSP*, Orlando, FL, USA, May 2002.
- [11] G. Barriac, N. B. Jacobsen, and U. Madhow. Beyond BAD: A parallel arbitration framework for low-complexity equalization. In *Proc. 39th Annual Allerton Conf. on Communication, Control, and Computing*, Oct. 2001.

STANDARDS CONTRIBUTIONS

- [1] N. B. Jacobsen. “TDMA H-ARQ Code for Layer-2 Relay in LTE-Advanced”. 3GPP TSG RAN WG1 Long Term Evolution (LTE) R1-090775, Alcatel-Lucent, Murray Hill, NJ, Feb. 2009.
- [2] Noah B. Jacobsen, Anthony Soong, Ji Wook Chung, Tom Richardson, Aamod Khandekar, Sung-Eun Park, Jun Xu, and Xin Yu. “LDPC Coding Proposal for LBC”. 3GPP2 Ultra Mobile Broadband (UMB) C30-20070315-003, Alcatel-Lucent, Huawei, LG Electronics, QUALCOMM Incorporated, RITT, Samsung, ZTE, Mar. 2007.
- [3] N. B. Jacobsen. “Design of flexible rate-compatible LDPC codes”. 3GPP2 Ultra Mobile Broadband (UMB) C30-20070108-051, Alcatel-Lucent, Murray Hill, NJ, Jan. 2007.

TECHNICAL REPORTS

- [1] N. B. Jacobsen. “Detection of a coded signal”. Technical report, LGS Innovations, Florham Park, NJ, May 2011.
- [2] N. B. Jacobsen. “On the dynamic re-use of satellite link spectrum with an active sensing cognitive radio network”. Technical report, Toyon Research Corp., Goleta, CA, July 2006.
- [3] N. B. Jacobsen. “Fast detection of LO signal from heterodyne receivers”. Technical report, University of California, Santa Barbara, Santa Barbara, CA, Nov. 2005.
- [4] N. B. Jacobsen. “Iterative APP interference cancellation for LDPC coded UWB communication”. Technical Report National Science Foundation (NSF) EASI 0310419, Yokohama National University, Yokohama, Japan, Feb. 2004.
- [5] N. B. Jacobsen. “Noncoherent Iterative Demodulation and Decoding for OFDM Systems”. Technical report, Motorola Labs, Schaumburg, IL, Sept. 2002.
- [6] N. B. Jacobsen and E. Chojnacki. “Infra-red propagation through various waveguide inner surface geometries”. Technical Report SRF 990301-01, Floyd R. Newman Laboratory of Nuclear Studies, Cornell University, Ithaca, NY, Mar. 1999.

PROFESSIONAL EXPERIENCE

06/2019-
present

Director of Data Science, Mission Solutions Group, North Charleston, SC

- I am currently the Director of Data Science with Mission Solutions Group, a defense contractor based out of North Charleston, SC. At MSG we recognize the vital importance of reliable and secure communication and intelligence in the national defense and intelligence communities. A central theme of our work is the development products and services that facilitate “perfect information exchange” for our customers in the defense and intelligence sector. As Director of Data Science I lead the integration of data-centric methodology across all domains of the company, including satellite communications, cyber-systems and information security. As MSG continues to grow, we will continue to demonstrate industry leadership with innovative applications of data science, machine learning and artificial intelligence for our customers.

04/2013–
present

Founder/Owner/CEO/Principal Scientist, Aquerre Technologies, North Charleston, SC

- I manage and execute all aspects of company operations including but not limited to:
 - Business Entity Financial Statements, Taxes and Filings
 - Online Web, Email and Domain Name Services Management
 - Net Security: Custom Firewall, Encryption Logic Schemes, and Linux Kernel
 - Amazon Web Services (AWS) automated management via Python API
 - Contract Bid and Proposal; and Contract Execution Management
 - Human Resources and Employee Search/Hiring
 - Marketing and Brand Management incl. Copyright and Trademark Filings
 - Independent Research and Development (IR&D) Activities with applications to Machine Learning Systems, Data Automation and Information Processing
- Highlights:
 - As Principal Scientist at Aquerre Technologies, I have performed original research on machine learning and artificial intelligence using graph based models for system representation and algorithm development. My original research concepts have formed the basis for proposals to federal R&D funding agencies. My forward looking research statement can be viewed online at https://aquerre-technologies.com/files/cv/Noah_Research_Statement.pdf
 - Aquerre Technologies’ R&D funding proposals can be viewed at <https://aquerre-technologies.com/bandp/index.html>
 - “AQUERRE” is granted U.S. Trademark for “Computer programs for constructing, encoding, and decoding Error Control Codes (ECCs)” (03/29/2016). Our technical expertise and patent work on ECC technologies is a core technical asset of the company. See <https://aquerre-technologies.com/links.html> for more information about our trademark and copyright pursuits.
 - Completed the 2016 California Dept. of Housing and Community Development Blue Books Contract (Standard Agreement #15-10-007)
 - * Leveraged our *data automation and information processing* expertise as prime contractor for the State of California.
 - * New product available for purchase from our web page, <https://aquerre-media.com>
 - * 2017 U.S. Trademark obtained for “Books and E-books in the field of law and Government”.

04/2013– present	<p>Founder/Owner/CEO/Principal Scientist, Aquerre Technologies, North Charleston, SC</p> <ul style="list-style-type: none"> • Highlights (continued): <ul style="list-style-type: none"> – Ongoing production work related to our subsidiary media unit, https://marsjazzproject.com <ul style="list-style-type: none"> * Composed, recorded, and published new song “They Take It Away” (Copyright Jan. 26, 2018) and new Christmas song “This Is The Time” (Copyright Dec. 20, 2016), released as singles at https://marsjazzproject.com/studio. The <i>marsjazzproject</i> studio is capable of full-circle music production, including original song composition and lyrics, and in-house recording, engineering and web publishing. * Produced a ten track vocal jazz album of jazz standards “Beautiful.” with Los Angeles based studio musicians featuring N.B. Jacobsen on vocals and guitar, in collaboration with Pacifica Studios in Culver City. Product was released in Dec. 2014 for free on our web page, https://marsjazzproject.com/studio/beautiful, with a multi-media web design featuring playable tracks with song composer data, visual art/photos about the project, and option to purchase a physical CD. (Work of the Performing Arts U.S. Copyright May 26, 2016). * Live performance work comprising mainly open-mic venues and street performance with some shows announced on our twitter page, https://twitter.com/marsjazzproject, with the hashtag <i>#marsjazzprojectlive</i>
08/2018– 11/2018	<p>Operations Research Analyst (Data Scientist), U.S. Army Cyber Command, Fort Huachuca, AZ</p> <ul style="list-style-type: none"> • Operations research work for Network Enterprise Technology Command (NETCOM), a unit of U.S. Army Cyber Command, to develop, maintain and defend Department of Defense global information networks. Work comprises applications of predictive models and analyses, machine learning, and artificial intelligence to cyber-security.
09/2012– 03/2013	<p>Sr. Operations Research Scientist, Dex One/Dex Media, Santa Monica, CA</p> <ul style="list-style-type: none"> • Performed predictive analytics research and development work for Dex Media’s local business advertisement search engine, DexKnows.com.
Spring 2012	<p>Adjunct Associate Professor, Columbia University, New York, NY</p> <ul style="list-style-type: none"> • Developed curriculum (lectures, homeworks, exams) and taught graduate level Linear Systems Theory in the Electrical Engineering Department at Columbia University. • Lectures, homeworks and solutions archived online at https://aquerre-technologies.com/teaching.html.

- 07/2006–
10/2011 **R&D Program Lead**, Alcatel-Lucent, Bell Labs, Murray Hill, NJ
- Performed research and development work for Alcatel-Lucent’s Forward Looking Technology Group and Government Communications Laboratory
 - Deep focus on the development of new high-performance Error Correcting Codes (ECCs) with applications to commercial cellular systems and tactical radio systems. Work resulted in a U.S. Patent, multiple academic conference papers and multiple technical contributions to international wireless standards.
 - Development of anti-jam technologies for tactical radio communication systems including satellite based systems. Lead transition of advanced algorithms to chip development team.
- Fall 2010 **Adjunct Lecturer**, Tandon School of Engineering, New York University, Brooklyn, NY
- Developed curriculum (lectures, homeworks, exams) and taught graduate level Probability Theory in the Electrical and Computer Engineering Department at Brooklyn Polytechnic University.
- 09/2005–
06/2006 **Post-Doctoral Researcher**, University of California, Santa Barbara, Santa Barbara, CA
- Researched methods of detection and utilization of unused radio frequency (RF) spectrum for software-defined radio applications and for re-use of terrestrial digital broadcast television and satellite communication channels.
- 01/2006–
06/2006 **Research Consultant**, Toyon Research Corporation, Goleta, CA
- Consulting services on the topic of radio frequency re-use in satellite communication networks.
- 06/2003–
09/2003 **Visiting Researcher**, Yokohama National University, Yokohama, Japan
- I was awarded a grant to visit Yokohama National University from the National Science Foundation (NSF) and Japan Society for the Promotion of Science (JSPS) as part of the East Asia Summer Institutes (EASI) Program.
- 06/2002–
09/2002 **Researcher Intern**, Motorola Labs, Schaumburg, IL
- Motorola co-funded a portion of my Ph.D. research and I spent a summer in Schaumburg researching and comparing non-coherent vs. coherent methods of coding and modulation for next generation cellular systems.
- 09/1998–
05/2000 **Selections Director**, Cornell Concert Commission, Cornell University, Ithaca, NY
- I served as Selections Director on the executive board of the Cornell Concert Commission (CCC) for two consecutive years. The CCC is the largest on campus organization with a budget in the hundreds of thousands charged with bringing major and up-and-coming musical acts to campus.

09/1998–09/1999 | **Student Researcher**, Floyd R. Newman Laboratory of Nuclear Studies, Cornell University, Ithaca, NY

- I worked with the Superconducting Radio Frequency (SRF) group at Floyd R. Newman Laboratory of Nuclear Studies at Cornell University, as part of Cornell's Engineering Cooperative Education Program.

EDUCATION

09/2005 | **Ph.D. *Electrical and Computer Engineering***
University of California, Santa Barbara
Santa Barbara, CA

06/2002 | **M.S. *Electrical and Computer Engineering***
University of California, Santa Barbara
Santa Barbara, CA

06/2000 | **B.S. *Electrical Engineering***
Cornell University
Ithaca, NY

06/1996 | **H.S. Diploma *Arts and Sciences***
C.W. Baker High School
Baldwinsville, NY

SOFTWARE FLUENCY

- GNU Linux (expert), Debian/Ubuntu, C/C++, Bash Shell Scripting, OpenOffice (Writer/Calc/Impress), Microsoft Office (Word/Excel/PowerPoint), Microsoft Project, LaTeX, Octave, MatLab, Python, R/R Studio, Java, BASIC, HTML, Emacs, Vi, Gimp, Ardour, Audacity, Mozilla, LUKS Encryption Library, Iptables Firewall, SQL, Linux Kernel Source Compilation, Tor, SSH, Bind9, Apache2, Postfix, Dovecot, OpenDKIM, Spamassassin, Amazon Web Services (AWS) Python API (Boto3), Blender, Docker, Kubernetes, TensorFlow, ArangoDB

RECENT CONFERENCES

- Presenter, 2021 International Conference on Artificial Intelligence in Information and Communication (ICAIIIC), Virtual, Apr. 13-16, 2021.
- Attendee, 2020 Department of Defense Artificial Intelligence Symposium, Virtual, Sep. 9-10, 2020.
- Attendee, 2019 National Security Commission on Artificial Intelligence (NSCAI), Interim Conference, Washington DC, Nov. 5, 2019

- Attendee, 2018 Entrepreneurship at Cornell Celebration Conference, Cornell University, Ithaca, NY, Apr. 19-20, 2018
- Presenter, 2016 Air Force Space and Missile Systems Center (SMC) Small Business Industry Days (SBID), Los Angeles, CA, Oct. 18-20, 2016
- Attendee, 2016 National Security Agency (NSA) Tech Expo, Acquisition Resource Center (ARC), Hanover, MD, Mar. 23, 2016
- Attendee, 2015 National Security Agency (NSA) Business in a Minute, Acquisition Resource Center (ARC), Hanover, MD, Jun. 3, 2015
- Attendee, 2014 National SBIR/STTR Conference and Short Course “How To Develop An Acceptable Accounting System for Government Grants and Contracts”, Washington, DC, Jun. 16-18, 2014

TEACHING CERTIFICATIONS

- California Basic Educational Skills Test (CBEST) Completed, December 2013

PROFESSIONAL SOCIETIES

- Institute of Electronic and Electrical Engineers (IEEE), Member, Mar. 2002 to present

VOLUNTEER ACTIVITIES

- Member of the Charleston Symphony Orchestra Chorus (CSOC), Sept. 2019 to present
- Member of the Cornell Alumni Admissions Ambassador Network (CAAAN), Dec. 2019 to present

NOTABLE ACHIEVEMENTS

- Recipient of the U.S. Army NETCOM Commander’s Coin for Excellence by GEN John Baker in November 2018.
- *marsjazzproject* featured on Sultanate of Oman Radio Show (Muscat, Oman) with interview and live studio performance, July 2017.
- “AQUERRE” granted U.S. Trademark for “Computer programs for constructing, encoding, and decoding Error Control Codes (ECCs)” on March 29, 2016; and for “Books and E-books in the field of Law and Government” on June 13, 2017.
- Invited Speaker, 2016 Air Force Space and Missile Systems Center (SMC) Small Business Industry Days (SBID), Los Angeles, California, Oct. 18-20, 2016

- Session Chair, “Wireless Networks and Communications,” 43rd Conference on Information Sciences and Systems (CISS), Johns Hopkins University, Baltimore, MD, March 18-20, 2009
- Recognition for Contribution to the 3GPP2 Ultra Mobile Broadband (UMB) Air Interface Specification, Low Density Parity Check (LDPC) Ad Hoc Group, 2007
- National Science Foundation (NSF) and Japan Society for the Promotion of Science (JSPS) East Asia Summer Institutes Fellowship, Yokohama National University, Japan, 2003
- Dan E. Noble Fellowship for Doctoral Research at UCSB, Motorola Labs, 2002–2005.
- California Microelectronics Innovation and Computer Research Opportunities (MICRO) Fellowship, University of California, Santa Barbara, 2000–2001
- Theodore C. Ohart Scholarship in Engineering, Cornell University, 1999–2000
- Participant in the Cornell University College of Engineering Cooperative Education Program, with the Floyd R. Newman Laboratory of Nuclear Studies at Cornell University, 1998–1999
- Cornell University Dean of Students Service Award for service as Selections Director of the Cornell Concert Commission, 1998 and 1999

PERSONAL INFORMATION

- *Citizenship:* U.S. Citizen
- *Date of Birth:* February 15, 1978
- *Mailing Address:* 7571 Peppercorn Ln, North Charleston, SC 29420
- *Phone Number:* (310) 857-8049
- *E-mail Address:* noah@aquerre-technologies.com
- *E-mail Address #2:* noah@marsjazzproject.com
- *Web Page:* <https://aquerre-technologies.com>
- *Web Page #2:* <https://marsjazzproject.com>
- *Web Page #3:* <https://aquerre-media.com>
- *Musical Instruments:* Guitar, piano and voice
- *Athletics:* Jogging and cycling
- *Interests:* Vegetarian cooking

REFERENCES

Available upon request.