

# ANDREW A. GANSE

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## PROFILE

Experienced data and applied scientist with background in machine learning, sensor fusion, inverse problems, signal processing, and analyzing messy data. Strong communication skills and interest in serving the customer. Prefer a data or applied science role working in or leading project teams of <10 people, developing solutions for sensor data and machine learning problems.

## EDUCATION

**Ph.D. Geophysics**, University of Washington.

**B.S. Electrical Engineering**, University of Washington.

## PROFESSIONAL EXPERIENCE

**Radar Data Scientist, Echodyne Corporation.** *Dec 2017 – present.*

- Project lead for deep learning projects in detection and classification on novel radar data for drone, security, and automotive problems. SL, RL, Keras, Tensorflow, Titan V's.
- Lead of field-test data team, analyzing the dynamic behavior of radar control systems and characterizing performance of target detection, target tracking, and clutter-rejection algorithms using Python/Pandas and Matlab.
- Designed and led build-out of a relational database system for statistical analysis of field test datasets, using PostgreSQL and Python.
- Technical management of groups of 3-5 people per project in multiple concurrent projects; mentoring of interns and junior staff; co-organizer of company's intern program; advising coworkers on use of git, python environments, and Linux system administration.

**Principal Scientist, Anseres Research & Technology LLC.** *Sept 2016 – present.*

- Scientific research consulting in defense, geophysical, and space science applications.
- Completed multiple federal R&D subcontracts building on my earlier research in statistical inference for remote sensing problems.
- Led SBIR proposal submission on Deep Learning for Clutter Reduction in [Sonar Systems], with university collaborators.
- Internal R&D predicting estuarine salinity from electric fields using TensorFlow neural networks.

**Data Scientist, Spare5.** *Jan 2016 – June 2016.*

- Designed and built out machine learning algorithms for data quality assessment and user reputation evaluation on Spare5's intelligent crowdsourcing platform.
- Innovated in the use of probabilistic classifiers, expectation maximization, word2vec; in R/Rserve, Python/Pandas, PostgreSQL, Git.
- Engaged in press/analyst briefings, meetings with customers, public speaking (Datapalooza).

**Senior Research Physicist, Applied Physics Laboratory.** *Apr 1999 – Nov 2015.*

- Solved nonlinear regression, inversion, optimization, tracking, and signal processing problems in acoustic, seismic, electromagnetic, and gravity remote sensing applications; using Python, Matlab, Octave, C, Java, Fortran, Linux shell scripting; administrated Linux clusters.
- Quantified uncertainty and resolution in sensor fusion and statistical inference problems.
- Implemented Kalman nonlinear smoothing/tracking and parameter estimation algorithms to

- acoustically track a 5km long(!) vertical hydrophone array for our ocean acoustic experiment.
- Analyzed fluctuations in intensity and pulse spreading of ocean acoustic signals interacting with ocean internal waves, testing prevailing theory with our at-sea experimental measurements.
- Investigated resolution of radio-science gravimetric sensing of Jovian moons' ice shell features via proposed Europa Clipper spacecraft trajectories.
- Solved controlled-source electromagnetic inverse problems for salinity profile monitoring in sensitive estuarine ecologies using a new river-bottom instrument.
- Developed Markov Chain Monte Carlo based Bayesian inversion of ocean acoustic data via distributed computing on a Linux cluster.
- Organized technology transfer of a new APL-developed technology to a small business.
- Refactored a complex model code to fit all data into memory at once, increasing speed 20x and enabling to compute it in an optimization problem on a cluster in acceptable timespan.
- Designed research experiments, presented results at conferences, wrote proposals and reports to sponsors, interfaced with sponsors, wrote and reviewed research papers.
- Led system engineering and field testing for an experimental "towed CTD chain" cabled instrument containing 90 sensors, managed teams of 2-6 others at a time in testing and operation of the system. Managed two students in statistical programming projects.

**Database Programmer, Pacific States Marine Fisheries Commission. Jan–Dec 1998.**

- Programmed data processing and extraction routines for an Oracle database of commercial fishing in western U.S. Provided expertise in Oracle, SQL, UNIX to two PSMFC agencies.

**ADDITIONAL EXPERIENCE**

- **Recurring guest lecturer, grad-level geophysical statistical inference. 2008 – 2015.**  
Wrote and taught 1.5-hour lectures for numerous graduate-level geophysical statistical inference classes of ten students. Developed the seven computational lab assignments still used today.
- **Outreach talks and activities for school groups. 1999 – present.**  
Presenting exciting, inspirational science talks to groups of 20-100 children, ages 4-18.

**SELECTED PUBLICATIONS**

- Andrew, R.K., **A.A. Ganse**, A.W. White, J.A. Mercer, M.A. Dzieciuch, P.F. Worcester, "Low-frequency Pulse Propagation over 510 km in the Philippine Sea: A Comparison of Observed and Theoretical Pulse Spreading", *J. Acous. Soc. Am.*, 140, 1 (2016).
- **Ganse A.A.**, S. Vance, and J. Roberts (2014), "Inverse theory resolution analysis in planning radio science gravity investigations of icy moons", Abstract P43C-3997, Fall Meeting AGU 15-19 Dec, San Francisco (2014).
- **Ganse A.A.**, R.K. Andrew, F.S. Henyey, J.A. Mercer, P.F. Worcester, M.A. Dzieciuch, "Model and data comparisons of ocean acoustic intensity statistics in the Philippine Sea 2010 experiment", *J. Acoust. Soc. Am.* 135 , 2306 (2014).
- **Ganse A.A.**, "Resolution analysis of the inverse problem for geoacoustic experiment design", *J. Acoust. Soc. Am.* 133, 3304 (2013).
- **Ganse A.A.** and R.I. Odom, "Uncertainty and resolution in continuum inversion of ocean bottom geoacoustic properties", *J. Acoust. Soc. Am.* 124, 2501 (2008).
- **Ganse A.A.** and R.I. Odom, "Higher Order Statistics for Nonlinear Inverse Problems via Analytical Methods", *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract S42B-03 (2006).