



ALLAN K. HAAS, PHD

EDUCATION

DOCTOR OF PHILOSOPHY IN GEOPHYSICS

Colorado School of Mines. Golden, Colorado

MASTER OF SCIENCE IN GEOPHYSICS

Colorado School of Mines. Golden, Colorado

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

University of Arizona. Tucson, Arizona

EXPERIENCE

Senior Engineering Geophysicist

hydroGEOPHYSICS, Inc., Richland, WA

2014 – Present

Develop new geophysical measurement methods and techniques. Develop new, and enhance existing geophysical equipment. Perform geophysical research to support the development of new products. Engineer electronic circuits for geophysical equipment. Responsible for electronics laboratory and quality assurance of fabricated equipment.

Graduate Student of Geophysics

Colorado School of Mines, Golden, CO

2007 – 2014

Researched the electrical signals produced by hydraulic fracturing and fluid flow through porous media. Discovered the presence of electrical signals produced by subsurface leakage of fluids from wells. Discovered the electrical signature of two phase fluid flow through porous media. Participated in the Colorado School of Mines SmartGeo Fellowship Program. I worked at the following summer internships occurred while a graduate student.

Geophysicist Intern

ConocoPhillips, Houston, TX

Summer 2011

Researched the physics of non-seismic methods of imaging hydraulically induced and natural rock fracture networks. Developed simple 2D fracture models to test and evaluate the physics of illuminating fracture networks in rocks through the use of chemical concentration gradients. Used COMSOL Multiphysics software system to model the coupled physics problems of fracture illumination.

Geophysicist Intern

BP, Houston, TX

Summer 2010

Detailed seismic interpretation using SeisWorks – top of salt. Resource development - drill center assessment and wellbore trajectory planning for deep water subsalt resource. Developed 3D model for integrated drill trajectory and hazard assessment – shallow hazards, inclination, & salt exit.

Principal Engineer

Ball Aerospace & Technologies, Systems Test, Boulder, CO

2006 – 2007

Developed and tested new cold cable (cold FPA to warm Focal Plane Electronics-FPE) rigid-flex PWB technology. Led the development and introduction of high reliability, flexible, rigid-flex PWB design methodology. Wrote Integration and Test Guidebook - Infrared Technology Section. Wrote Focal Plane Electronics Guidebook - Rigid-Flex Technology Section - critiqued flex PWB products.



Associate Program Manager, Senior Packaging Engineer

1998 – 2005

Rockwell Scientific Company, Camarillo, CA

Program Manager for Wide Field Camera 3 (WFC3) near infrared imager upgrade – Hubble Space Telescope. Program Manager for HAWAII-2 2Kx2K SWIR astronomical imager programs – world wide sales and production. Designed and implemented ultra-light weight WFC3 FPA packaging and production. Packaged highly successful Deep Impact mid-wave infrared FPA for spectrometer sensor – based on WFC3 packaging. Designed and implemented packaging – New Horizons – Pluto Kuiper Belt short-wave infrared >20 year mission. Designed and implemented 8Kx8K visible imager packaging for space flight. Designed and implemented 2Kx2K short wave and mid wave imager packaging for space flight. Led the deployment of metal substrates in visible and IR imager packaging.

Staff Engineer

1994 – 1998

L3 Communications, Ocean Systems Division, Sylmar, CA

Program Manager for borehole seismic receiver array business development activities. Organized and executed the first successful borehole test of a high channel count thin-line hydrophone array. Researched high temperature thin line down hole fiber-optic hydrophone sensor array systems.

Staff Engineer

1992 – 1993

Superconducting Super Collider Laboratory, Waxahachie, TX

Supervisor for the global machine radiation safety system design and installation. Supervised one Technician and one Radiation Physicist. Performed a Monte Carlo analysis of possible radiation hazards associated with the Linear Accelerator portion of the particle accelerator system. Found a possible radiation hazard in the Klystron Gallery from a beam dump near the waveguide portals to the Linear Accelerator. Corrective action was recommended.

Research Engineer

2014 – Present

Lockheed Missiles & Space Co., Inc., Sunnyvale, CA

Principal Investigator of multiyear IR&D sonar system development project. Planned technology development program for acoustic sensor systems. Researched all fiber-optic sensor system architectures.

PROFESSIONAL CERTIFICATIONS

MSHA certified
Hanford Rad Worker II Certified
DOT Medical Certification
OSHA certified (29 CFR 1910.120) Hazardous Materials Awareness (Dept. of Labor)
OSHA certified (29 CFR 1910.134) Mask Fit (Dept. of Labor)

PUBLICATIONS, ABSTRACTS, AND PRESENTATIONS

– Peer Reviewed Publications –

Revil, A., Mao, D., Haas, A. K., Karaoulis, M., & Frash, L. 2015. “Passive electrical monitoring and localization of fluid leakages from wells.” *Journal of Hydrology*, 521, 286-301.

Haas, AK, A Revil, M Karaoulis, L Frash, J Hampton, M Gutierrez, and M Mooney. 2013. “Electric Potential Source Localization Reveals a Borehole Leak During Hydraulic Fracturing.” *Geophysics* 78 (2).

- Richards, K., A. Revil, A. Jardani, F. Henderson, M. Batzle, and A. Haas. 2010. "Pattern of shallow ground water flow at Mount Princeton Hot Springs, Colorado, using geoelectrical methods." *Journal of Volcanology and Geothermal Research* 198 (1-2): 217 - 232. doi:DOI: 10.1016/j.jvolgeores.2010.09.001.
- Martinez-Pagan, P., A. Jardani, A. Revil, and A. Haas. 2010. "Self-potential monitoring of a salt plume." *Geophysics* 75 (4): WA17.
- Haas, Allan, and Andre Revil. 2009. "Electrical burst signature of pore-scale displacements." *Water Resources Research* 45 (W10202) (October 16). doi:10.1029/2009WR008160.

– Books –

- Revil, A., Jardani, A., Sava, P., & Haas, A. 2015. *The Seismoelectric Method: Theory and Application*. John Wiley & Sons.
- Haas, A. K. 2013. *External detection and localization of well leaks in aquifer zones* (Doctoral Dissertation, Colorado School of Mines).
- Haas, A. K. 2010. *Electrical Instabilities of 2-phase Flow of Water in Unconsolidated Porous Materials* (Master's Thesis, Colorado School of Mines).

– Conference Proceedings –

- Hakkarinen, D., Camp, T., Haas, A., & Revil, A. 2011, April. Near-real-time analysis for REACTS. In *Information Processing in Sensor Networks (IPSN), 2011 10th International Conference on* (pp. 151-152). IEEE.
- Robberto, M., M. Stiavelli, S. M Baggett, B. Hilbert, J. W MacKenty, R. A Kimble, R. J Hill, et al. 2004. Selection of the infrared detectors for Wide Field Camera 3 on the Hubble Space Telescope. In *Proceedings of SPIE*, 5167:166. doi:10.1117/12.507334.
- Robberto, M., S. M Baggett, B. Hilbert, J. W MacKenty, R. A Kimble, R. J Hill, D. A Cottingham, et al. 2004. The infrared detectors for the wide field camera 3 on HST. In *Proceedings of SPIE*, 5499:15. doi:10.1117/12.551807.
- Robberto, M., S. M Baggett, C. Hanley, B. Hilbert, J. W MacKenty, E. S Cheng, R. J Hill, et al. 2003. Infrared detectors for WFC3 on the Hubble Space Telescope (Proceedings Paper). In *Proceedings of SPIE*, 4850:1191-1200. March 5. doi:DOI: 10.1117/12.461197.
- Montroy, J. T, J. D Garnett, SA Cabelli, M. Loose, A. B Joshi, G. W Hughes, L. J Kozlowski, A. K Haas, S. S Wong, and M. Zandian, others. 2002. Advanced imaging sensors at Rockwell Scientific company. In *Proceedings of SPIE*, 4721:212. doi:doi:10.1117/12.478849.
- Hall, D. N.B, K. W Hodapp, D. L Goldsmith, CA Cabelli, A. K Haas, L. J Kozlowski, and K. Vural. 2000. Characterization of $\lambda_c=5 \mu\text{m}$ Hg:Cd:Te arrays for low-background astronomy. In *Proceedings of SPIE*, 4008:1268 - 1279. doi:doi:10.1117/12.395444.
- Cabelli, CA, D. E Cooper, A. K Haas, L. J Kozlowski, G. L Bostrup, A. C Chen, J. D Blackwell, J. T Montroy, K. Vural, and W. E Kleinans, others. 2000. Latest results on HgCdTe 2048x2048 and silicon focal plane arrays. In *Proceedings of SPIE*, 4028:331.
- Haas, Allan K., and Fred DeMetz. 1996. "High channel capacity borehole data acquisition & telemetry system." *SEG Technical Program Expanded Abstracts* 15 (1): 198-201. doi:10.1190/1.1826555.
- Karlak, R. F, D. F Hotz, and A. K Haas. 1989. Doppler laser interferometry and low expansion materials - A merging of technologies. In *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ed. B. D. Seery, 1044:227-232. Presented at the Society of Photo-Optical Instrumentation Engineers (SPIE) Conference. June.

Stuart, F. E, and A. K Haas. 1982. "Fluorescent plastic coatings for improving ultraviolet and blue response of cooled silicon charge-injection devices(CIDs)." *Instrumentation in astronomy IV*: 52–68.

– **Oral Presentations** –

- A.N. Tarrell, A. Haas, A. Revil, L.A. Figueroa, and D. Rodriguez. 2010. Near-Real-Time Geophysical and Biological Monitoring of Bioremediation Methods at a Uranium Mill Tailings Site in Rifle, Colorado Oral presentation H24E-06. H24E. Hydrogeophysical Data Fusion and Integrated Site Investigation Methods III, AGU Fall Meeting, 13-17 December, 2010, San Francisco, USA.
- R. Snieder, E. Slob, A. Revil, A. Haas. 2010. Extracting the static response of the subsurface from dynamic field fluctuations, Geosciences Research Program in the Department of Energy's Office of Basic Energy Sciences, PI meeting, March 11-12, 2010, Gaithersburg, Maryland, USA.
- Haas, A. K, CA Cabelli, L. J Kozlowski, W. E. Tennant, and J. T Montroy. 1999. 2048X2048 Visible/Infrared HgCdTe Focal Plane Arrays (FPAs). ROCKWELL INTERNATIONAL CORP THOUSAND OAKS CA SCIENCE CENTER, August. <http://handle.dtic.mil/100.2/ADA390403>.

– **Poster Sessions** –

- Hakkarinen, D., Camp, T., Chen, Z., & Haas, A. 2012, February. Reduced Data Communication for Parallel CMA-ES for REACTS. In *Parallel, Distributed and Network-Based Processing (PDP)*, 2012 20th Euromicro International Conference on (pp. 97-101). IEEE.
- Smith, A. Haas, et al. 1993. A High Reliability Oxygen Deficiency Monitoring System, Superconducting Super Collider Laboratory, '93 Particle Accelerator Conference Poster Session, 5-17-93.

– **Inventions** –

- Haas, A.K., and A. Revil, 2013. "Monitoring of Drinking Water Aquifers During Possible Contamination Operations" US Patent and Trademark Office Application Number 13751978, Colorado School of Mines, Golden, Colorado, January 28.
- Allan Haas. 1987. Solid State Imager Readout Employing a Laser, Inventor. Lockheed Invention. Lockheed Missiles & Space Company, Inc.