

Eli Van Cleve, Ph.D.

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Innovative Scientist and Engineer

Dynamic and self-directed scientist and engineer with over 15 years of multidisciplinary experience spanning academia, government, and industry, solving new and challenging problems. Adept at developing innovative scientific techniques and innovative technologies, with the ability to rapidly learn and apply knowledge in diverse fields, including physics, radiology, cryogenics, and magnetism. Skilled in prototyping, project leadership, and fostering collaboration in interdisciplinary teams.

Areas of Expertise

Advanced Scientific Research and Experimentation | Cryogenic Equipment design, construction, maintenance| Cryogenic experimentation | Atomic Clock Development | XRF analysis | Spectral Analysis | Simulation and Modelling (COMSOL, Python, MATLAB, Zemax) | Prototyping and Rapid Iteration | Team Leadership | Project Management | Programming | Data Analysis | Word, Excel, PowerPoint, Fortran, CAD, LabVIEW, Mathematica | Python Machine Learning | Optics: Lasers, interferometry, ellipsometry | Optical design | LASERS | Active Security Clearance: TS/SCI

Professional Experience

Boeing Company

June 2022 – February 2025

Scientist

Lead cross-functional teams to integrate optics, mechanics, and electronics for atomic clock development.

- Led the design and construction of free-space and fiber-optic two-photon Rb atomic clocks, achieving accuracy competitive with leading industry standards.
- Conducted experiments on atomic clock prototype component development and optimization.
- Conducted advanced simulations and calculations of magnetic fields, optimizing laboratory setups to mitigate electromagnetic interference.

Radiabeam Systems

September 2020 - November 2021

Associate Researcher

Directed the design of a cryomodule and superconducting undulator with integrated thermal and magnetic measurement capabilities.

- Directed RF, thermal, fluid, mechanical, and plasma simulations to validate designs.
- Led cryogenic mechanical design of superconducting hardware with integrated signal and cooling systems.
- Used COMSOL/ANSYS to optimize thermal, RF, and structural performance under cryogenic loads.

Van Cleve Scientific LLC

December 2018 - Present

Scientific Consultant

Designed and executed experiments to measure flux and energy output, providing data that supported an increase in device reliability.

- Conducted radiation simulations using MCNP on advanced devices, contributing to performance enhancements that improved energy efficiency.
- Used COMSOL to perform thermal and E&M simulations on scientific equipment and prototype devices.
- Leveraged COMSOL to perform complex thermal and electromagnetic simulations, accelerating prototyping cycles.
- Conducted EMI and thermal modelling for prototype instrumentation under cryogenic constraints
- Delivered simulation reports (thermal, RF, E&M) accelerating product development cycles for novel hardware
- Supported material selection and manufacturability improvements for low-temperature applications.

Bionaut Lab**March 2018 - December 2018****Senior Scientist**

Developed the first control systems for microbots at the LA office. Fabricated experimental components in-house or outsourced metal machining, ensuring quality compliance for all fixtures.

- Simulated, Designed, and constructed magnetic control systems for microbots, innovating highly controlled system architecture allowing for precise microbot motion control.
- Procured and developed key laboratory equipment, establishing manufacturing and simulation capabilities that reduced prototyping time.
- Conducted in vivo experiments with microbots and magnets for drug delivery, contributing to an improvement in precision targeting.
- 3D printed microbots smaller than 2 mm in size using FDM technology.

Tribogenics Inc.**September 2012 - November 2017****Senior Scientist**

Led the development, design, and testing of new source prototypes, improving product performance, developing fundamental theory of the devices operation, and achieving advancements in triboelectric device technology.

- Conducted simulations and experiments to verify theories of device operation and improve device performance, presenting findings at scientific conferences and refining prototypes for commercial use.
- Supervised and mentored R&D engineers, fostering growth and ensuring the successful execution of various projects.
- Designed and maintained high-vacuum (UHV) systems for manufacturing and residual gas analysis, meeting unique specifications for x-ray tube production and discharge experiments.
- Developed sorting algorithms for XRF device, improving efficiency.
- Developed the fundamental theory of operation for the device leading to fundamental improvements in device design.

Additional Relevant Experience**Lawrence Livermore National Laboratory****Post-Doctoral Researcher**

- Designed calorimeter for measuring phase diagram of hydrogen and deuterium in porous media, in particular silica and carbon aerogels for NIF, leading to the elimination of using Tritium for experiments.
- Measured hydrogen content in silicon aerogels using ion beam accelerator and determined that hydrogen on the surface of the aerogel impacts the mechanical properties of the aerogel.

University Of California, Irvine**Graduate Researcher**

- Investigated the 2D phase diagram of helium on lithium substrates (0.5K to 4K) and observed the 2D critical point where the liquid-vapour phase ended.
- Designed and built advanced cryogenic systems, including a pulsed laser deposition system and cryostat for depositing smooth lithium films onto Quartz Crystal Microbalances (QCM) at 4K.
- Developed a low-temperature, ultra-sensitive ellipsometer capable of detecting single statistical layers of helium and a low-pressure vacuum gauge using high-Q quartz tuning forks (32 kHz - 5 MHz).
- Measured helium film phases with QCMs at sub-0.1-layer sensitivity, revealing key phase transitions, including the Kosterlitz-Thouless line.
- Built cryogenic deposition systems and ellipsometers for sub-Kelvin phase transition studies of helium films.

Education

Doctor of Philosophy (PH.D.), Low Temperature Physics, University of California, Irvine

Bachelor of Science (B.S.), Physics, Carnegie Mellon University

IBM Data Science certificate, Coursera/IBM

Selected Publications and Patents

- M. Shpigelmacher, A. Sromin, J. Caputo, E. Oren, E. Van Cleve, N. Cohen, A. Geron, D. Seely, and A. Kiselyov, 2019, "Magnetic Propulsion System For Magnetic Devices", Patent Pending
- M. Shpigelmacher, A. Kiselyov, H. Sargsyan, S. Cho, J. Caputo, E. Van Cleve, E. Oren, 2019, "Propelling Devices for Propelling through a Medium, Using External Magnetic Stimuli Applied Theron.", Patent Pending
- A. Kiselyov, M. Shpigelmacher, E. Oren, A. Sromin, N. Cohen, A. Peleg, and E. Van Cleve, 2019, "Hybrid electromagnetic device for remote control of micro-nano scale robots, medical tools and implantable device", Patent Pending
- Collins, Adam L. and Camara, Carlos G. and Van Cleve, Eli, and Putterman, Seth J., "Simultaneous measurement of triboelectrification and triboluminescence of crystalline materials," REVIEW OF SCIENTIFIC INSTRUMENTS, 89, 013901
- Kucheyev, S. O. and Van Cleve, E. and Johnston, L. T. and Gammon, S. A., and Worsley, M. A., "Hydrogen Crystallization in Low-Density Aerogels," LANGMUIR, 31, 3854-3860 (2015)
- Van Cleve, E. and Lucas, B. and Ganlieli, Z. and Wong, E. W. and Cortes Jr., P. , and Mehta, N. and Cuadra, D., and Fong, J., and Hansen, S., and Kotowski, A., and Camara, C. G., "A Triboelectric Closed Loop Band System for the Generation of X-Rays", SPIE-INT SOC OPTICAL ENGINEERING, 9590, (2015)
- Huisman, F. M. and Velasco, A. E. and Van Cleve, E. and Taborek, P., "Quartz Tuning Forks as Cryogenic Vacuum Gauges," JOURNAL OF LOW TEMPERATURE PHYSICS, 177, 226-239 (2014)
- E. Van Cleve, S. O. Kucheyev, "Relaxation calorimeter for hydrogen thermoporometry," Review of Scientific Instruments, 48, 053901 (2013)