

# Michael Nothem, Engineer

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## LINKS

[linkedin](#)

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## SUMMARY OF QUALIFICATIONS

Experienced R&D engineer specializing in metrology & deposition equipment, with expertise in all design stages, from concept to maintenance. Skilled in collaboration, troubleshooting, and ensuring smooth operations. Known for optimizing processes, application development, material characterization and improving procedures. Adept at documenting, driving efficiency, and continuous improvement.

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## EMPLOYMENT HISTORY

Dec 2021 — Jan 2024

### Research & Design Engineer, VaporTech

Boulder Tech Center

- Conducted extensive R&D: literature reviews, formulation exploration, inventorship, executed experimental (DOE) methods, calculations, and statistical analysis (Minitab).
- Created multi-layer and amorphous thin films for antimicrobial and functional applications, analyzing trends, root cause failure analysis, batch variation, substrate compatibility, and longevity.
- Safely operated, maintained, calibrated wide range of equipment: Collaborated with engineers, vendors, and ensured continuous & immediate operation (replaced heaters, installed cathodes, checked for leaks, cleaned parts, built racks, regular upkeep). Controlled industrial HMI and PLC systems for R&D, performance monitoring, debugging, traceability systems, and documentation of process parameters.
- Programmed, troubleshooted and maintained testing equipment to streamline development processes: Programmed white light interferometer (WLI) for automatic macroparticle (defect) metrics. Implemented novel quality control measures of nano-thick residue layers programming WDXRF.
- Established timelines, coordinated lab testing, selected and procured equipment. Implemented maintenance schedules, statistical process control methods, developed video/written SOPs, product testing, sample preparation, and provided feedback for instrument and equipment improvements.
- Implemented stringent quality control, corrective actions and assurance tasks to verify copper compound phases between batches meet standards. SEM surface and cross-section measurements of morphology, microstructure, grain boundaries, EDS maps, uniformity, life-cycle, surface energy, thickness, adhesion.
- Upscaled, reconstructed, and supervised multiple six week continuous EPA durability tests, decreased failure rates of biocidal efficacy results for compliance. Developed and used an accelerated EPA test to expedite learning of material degradation.
- Documented project: reported progress, risk assessments, prepared technical reports, presentations, effectively communicated results to internal teams, management, and regulatory authorities.
- Collaborated with cross-functional teams, external labs, executives, and marketing for antimicrobial product launch strategies, optimized scaling cost for manufacturing, and coordinated with procurement for material sourcing.
- Developed knowledge of EPA regulatory requirements, created an official product label, provided necessary documents and support for regulatory acceptance, ensured adherence to health and safety standards, and promptly addressed compliance issues.
- Managed quality, FMEAs, control plans, financial records, and marketing materials for accessibility during meetings and reviews.
- Organized tasks, trained staff, coordinated meetings, scheduled progress updates, and tracked milestones for smooth project functioning.

Jun 2019 — Aug 2021

### Research Engineer, JILA REU, IMPACT Lab, NASA

CU Boulder

- Collaborated creatively with scientists, vendors, and machinists to create a rotating plasma vapor deposition reactor to simulate cosmic organic dust particles by coating powder in conductive materials.
- Designed component assemblies, electrical components, including vacuum chambers, power supplies, target materials, substrates, gas sources, turbo pumps, control systems, motor control, pneumatics.
- Utilized knowledge of physics & optimization techniques to enhance the efficiency of the PVD process.
- Managed revisions of assemblies for seamless integration & production of components.
- Wrote grants and presented findings to stakeholders, scientists, engineers, & representatives.
- Utilized SolidWorks CAD tool for 3D modeling, engineering drawings, GD&T implementation, & BOM.
- Conducted research on physics & optimization techniques for process improvement.
- Applied problem solving experience and knowledge to develop alternative solutions to difficult and unusual components and revision of assemblies.
- Managed project timelines and coordinated with stakeholders for successful completion.
- Maintained detailed documentation & performed quality control checks on reactor & components.
- Mentored junior scientists in designing & managing plasma vapor deposition system.

May 2018 — May 2019

### Biophysics Researcher, JILA REU Program, Betterton Lab, NSF

CU Boulder

- Conducted biophysics research in the Betterton Lab, using Matlab to develop and train a CNN for cell segmentation and identification during mitosis, contributing to cancer research.
- Modeled microtubule behavior using physics principles. Utilized Matlab's image processing capabilities to preprocess & analyze microscopy images, ensuring reliable data for training the neural network.

- Designed & conducted experiments to analyze microtubule properties, stability, & interactions, and used mathematical modeling to understand dynamics.
- Collaborated with a research team, brainstorming & troubleshooting to overcome challenges.
- Presented research findings to scientific audiences, demonstrating data visualization techniques & strong written communication skills in research papers. Co-authored papers detailing the CNN model.

Sep 2012 — Mar 2020

### Planetarium Presenter, Fiske Planetarium

CU Boulder

- Delivered over 100 educational planetarium shows, consistently incorporating constructive criticism to enhance presentation skills & effectively communicate astronomical concepts to diverse audiences.
- Proficiently operated advanced planetarium equipment and software, utilizing immersive visual displays to maximize audience engagement & comprehension.
- Mastered the art of storytelling to captivate & inspire curiosity among audiences, fostering a genuine interest in astronomy & igniting a passion for science.

## EDUCATION

Aug 2012 — Dec 2019

### Bachelor of Distributed studies Engineering & Physics, University of Colorado at Boulder

## SKILLS

PECVD/PVD Equipment, Vacuum technology, cathodes, anodes, source gases, mass flow controllers, precursors, optix partial pressure sensing, remote thermocouple

Optical, antimicrobial, multi-layer, amorphous coating, and intermitted deposition

Created SOPs, calibrated, maintained, equipment setup,-troubleshooting and schedules

Technical writing, test reports, documentation & communication

Trained/supported staff on instrument operation and maintenance

Procurement Processes- vendor communications, quotes, POs, RFQs

Chemical Laboratory: Safety, PPE, sample prep, storage handling, hazardous material

EPA testing protocols & ensured compliance, product labels, chemical analysis, CoAs, instrument validation

Control, flow & Pareto Charts

Data analysis, statistical process control, Gage R&R, DOEs

Digital marketing, product selection, plastic substrate adaptation

Experimental techniques, micro-electronics design, oscilloscopes, multimeter

ISO 9001, ASTM standards

Metrology: Spectroscopy, interferometry, reflectometry, ellipsometry, tribology & profilometry equipment

Materials Characterization: wafer cleaving, thickness, leachate testing, water contact angle, micro-hardness, colorimeter, glossmeter

Elemental Analysis Applications: WD X-ray Fluorescence Spectroscopy, Glow discharge spectroscopy

SEM-EDS, ion beam milling, cross-sections, microstructure, grain size, image processing

Durability & Corrosion testing: ASTM neutral salt spray, oxidation, micro-scratch, adhesion, chemical resistance

Mass finishing: vibrational & rotary tumbler, passivation

Software: Minitab, Optilayer, Matlab, Labview, Python, MS Office, ImageJ, Visual Studio

Fabrication: CAD (Solidworks), GD&T, blueprints, assembly, machine shop skills, PPE & safety, shear, lathe, mill, 3D printing

## REFERENCES

Patrick Sullivan, PhD Senior Scientist from- VaporTech

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Vladimir Gorokhovskiy & Tobin Munsat from- IMPACT Lab at CU Boulder

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