

Zain Clark

☎ (860) 555-3187 ✉ zain.clark@example.com 💼 linkedin.com/example/zainclark 📍 Hartford, CT 06103

SUMMARY

Senior **electromagnetics** researcher with 9 years advancing RF and microwave technologies through computational modeling, prototype fabrication, experimental characterization, and technical publication. Holds a Ph.D. in Electrical Engineering with deep experience in fundamental electromagnetism, wave propagation, RF circuits, **wave material interactions**, antennas, antenna arrays, **computational electromagnetics**, radar, remote sensing, imaging, communications, RF photonics, and functional materials. Leads research from early concept formation through **proof of concept** demonstrations, connecting simulation, fabrication, measurement, and multidisciplinary analysis. Develops technical proposals, reports, conference papers, peer reviewed articles, invention disclosures, and project plans. Mentors researchers, coordinates laboratory programs, resolves design tradeoffs, and communicates findings clearly across engineering, physics, program, and research leadership audiences.

EXPERIENCE

Senior Research Scientist, Electromagnetics

January 2023 - Present

Helios Advanced Systems

Hartford, CT

Leads applied electromagnetics research for RF sensing and communications concepts, guiding simulation, fabrication, measurement, publication, proposal, and multidisciplinary delivery activities.

- Led RF sensing research from analytical models through fabricated prototypes and laboratory measurements.
- Designed antenna array studies using **computational electromagnetics** and circuit analysis before fabrication.
- Characterized **wave material interactions** through repeatable measurements and prediction comparisons.
- Connected RF devices with photonic and functional material concepts for **aerospace** sensing.
- Authored **reports**, papers, invention disclosures, and proposal sections for **research programs**.
- Mentored junior researchers across modeling, **fabrication**, testing, data analysis, and documentation.

Research Scientist, RF and Electromagnetics

July 2020 - December 2022

Northstar Applied Physics Laboratory

Boston, MA

Developed antennas, RF circuits, electromagnetic models, and proof of concept experiments supporting radar, remote sensing, imaging, and communications research programs.

- Developed antennas and **RF circuits** for radar, **remote sensing**, and communications programs.
- Built multi domain workflows linking full wave behavior with RF circuit response.
- Planned calibrated experiments that identified loss mechanisms in microwave components.
- Investigated emerging RF materials for compact sensing, **imaging**, and **communications** architectures.
- Contributed work plans, risk assessments, and technical narratives to research **proposals**.
- Converted validated findings into conference submissions, reports, and **intellectual property** documentation.

Electromagnetics Research Engineer

June 2018 - June 2020

Pioneer Microwave Research Institute

Worcester, MA

Performed computational and experimental research on RF and microwave components, translating system needs into reproducible device targets and measurement workflows.

- Created antenna and passive RF models for engineered material prototypes.
- Compared computational predictions with vector network analyzer and chamber measurements.
- Designed fixtures and test procedures that improved prototype characterization traceability.
- Analyzed **radar** and **communications** use cases for device level research targets.
- Maintained notebooks, analysis scripts, figures, and summaries for design reviews.
- Resolved fabrication and measurement issues with physicists and electrical engineers.

Graduate Researcher, Applied Electromagnetics

August 2016 - May 2018

University Research Lab

Amherst, MA

Supported supervised graduate research in **antennas**, **RF circuits**, computational modeling, fabrication, measurement, and technical communication for sensing applications.

- Implemented full wave models for radiating and guided wave structures.
- Evaluated frequency response, electromagnetic fields, and material sensitivity through **simulation**.
- Fabricated laboratory prototypes and compared measured performance with simulated results.
- Investigated **wave propagation** through controlled experiments with documented uncertainty.
- Prepared figures and technical sections for journal and conference manuscripts.
- Coordinated laboratory equipment, datasets, schedules, and multidisciplinary research communication.

PROJECTS

RF Photonic Sensing Demonstrator 📅 2024

A small modeling result revealed a practical sensing path. Connected RF structures, photonic concepts, and functional materials through simulation and laboratory evaluation for an aerospace oriented proof of concept.

Antenna Array Characterization Program 📅 2022

Array coupling became the central design question. Combined computational electromagnetics, circuit analysis, fabrication, and calibrated measurements to refine bandwidth and radiation performance.

LEADERSHIP & AWARDS

- Research leadership recognition for advancing RF sensing and communications concepts from models through laboratory proof of concept demonstrations.
- Technical publication recognition for peer reviewed articles, conference proceedings, reports, and invention disclosures in applied electromagnetics.
- Mentorship leadership for guiding junior researchers across simulation, fabrication, measurement, analysis, and documentation.

EDUCATION

Ph.D. in Electrical Engineering

2018

University of Massachusetts Amherst GPA: 4.0

Amherst, MA

Coursework: Electromagnetics, RF circuits, antenna theory, computational modeling

Bachelor of Science in Electrical Engineering

2013

University of Connecticut GPA: 4.0

Storrs, CT

Coursework: Electromagnetic fields, microwave engineering, circuit analysis, signal processing

CERTIFICATIONS

- Export Control Awareness 📅 2024
- Laboratory Safety Training 📅 2023

TECHNICAL SKILLS

- **Electromagnetic Modeling:** Computational electromagnetics, full wave simulation, multi physics modeling
- **RF Circuit Design:** RF circuits, microwave circuits, active circuits
- **Antenna Engineering:** Antennas, antenna arrays, radiation analysis
- **Wave Analysis:** Wave propagation, wave material interactions, guided waves
- **Radar Systems:** Radar signal processing, radar sensing, radar imaging
- **Remote Sensing:** Remote sensing, imaging systems, aerospace sensing
- **RF Photonics:** RF photonic circuits, photonics, optical interfaces
- **Materials Research:** Functional materials, engineered materials, emerging structures
- **Experimental Testing:** Vector network analyzer, chamber measurements, calibrated measurements
- **Research Delivery:** Proof of concept, prototype fabrication, technology readiness
- **Technical Communication:** Research reports, conference proceedings, peer reviewed articles
- **Intellectual Property:** Invention disclosures, patent support, technical documentation

SKILLS

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| • Electromagnetics | • Computational Electromagnetics | • Imaging Systems | • Research Proposals |
| • RF Circuits | • Radar Signal Processing | • Communications Networks | • Technical Writing |
| • Wave Propagation | • Remote Sensing | • Prototype Fabrication | • Project Management |
| • Antenna Arrays | • RF Photonics | • Experimental Methods | |

PROFESSIONAL AFFILIATIONS

- Institute of Electrical and Electronics Engineers, electromagnetics and microwave research community participant.
- Applied Physics research network participant, supporting multidisciplinary exchange across RF, photonics, materials, and sensing.

LANGUAGES

- English (Native)
- Spanish (Intermediate)

ADDITIONAL INFORMATION

Work Status : Authorized to work in United States. No sponsorship required.

REFERENCES

AVAILABLE ON REQUEST