

# Michael Cordle

## Firmware Engineer

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Accomplished engineer with 13 years of experience covering a broad range of technical expertise and leadership roles. Extensive background in software development, embedded systems and optimization algorithms, with a track record of success in driving complex, multi-disciplinary projects. A collaborative team player with exceptional communication skills and a passion for creating efficient and innovative solutions that exceed expectations.

### SKILLS

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**Languages:** Assembly, C, C++, C#, Matlab, Python

**Protocols:** I2C, Modbus, NVMe, OPC, PCIe, SAS, SATA, UART

**Tools and Software:** Agile, Eagle, Gerrit, Git, Jira, JMP, Kepware, Perforce, Proxmark, Solidworks, VS Code

**Certifications:** NCEES Fundamentals of Engineering (FE) Certification, Six Sigma Brown Belt Certification

### EXPERIENCE

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**Firmware Engineer** November 2023 – Present  
Garmin International Boulder, CO

Perform in a leadership capacity to develop and support NFC-based features such as contactless payment into Garmin's line of Outdoor and Fitness devices.

- Analyze system logs, memory dumps and hardware-software interactions to debug and optimize firmware performance for low power consumption.
- Design electrical circuits, PCB layouts, and a python-based architecture to implement and support an automated end-to-end test system for nightly regression testing that runs on actual device hardware.
- Tune and optimize RF register settings in NFC hardware to meet performance and regulatory requirements.

**Technology Architect, CTO Office** June 2022 – November 2023  
Seagate Technology Longmont, CO

Engage with industry partners, consortia, academia and open communities to understand industry trends and influence Seagate's research and product development strategy.

- Managed the internal roadmap of innovative and disruptive HDD technologies, charting strategic paths for market adaptation.
- Led the development of a proof-of-concept HDD device with a native NVMe interface, with goals to reduce costs for customers and promote system composability through a common architecture.
- Member of the Immersion Cooling Steering Committee within the Open Compute Project (OCP) and co-lead of the Warranty Guidelines in Immersion Cooling workstream.
- Contributed to open-source C++ software projects to integrate support for Seagate's vendor-specific reliability telemetry system.

**Device Physics Research Engineer** May 2017 – June 2022  
Seagate Technology Longmont, CO

Advance the physical understanding of future magnetic recording technologies to generate IP for next generation data storage and underpin the roadmap of future HDD products.

- Led an initiative to align the development efforts of software engineering teams across the U.S. and Asia.
- Designed and implemented measurement tools to quantify physical recording characteristics and sources of read-back signal noise by making creative use of disk drive subsystem features.
- Trained machine learning models using PyTorch for applications such as reducing the computational complexity of micro-magnetic simulations and detecting anomalies in disk drive operation.
- Experimented with implementing multi-variable and multi-objective optimization algorithms in firmware.

## Design Engineering Lead

Seagate Technology

May 2015 – May 2017

Shakopee, MN

Provide strategic work direction to a cross-functional engineering team to meet product design requirements for performance, reliability, and cost.

- Achieved the company's fastest-ever product launch to capture an additional \$200M in revenue.
- Applied the 8D process to direct failure analysis and corrective actions of reliability test beds.
- Prepared highly complex technical content for customer design and product phase gate reviews.

## Integration and Development Engineer

Seagate Technology

May 2011 – May 2015

Shakopee, MN

Design manufacturing automation scripts and embedded firmware solutions to improve factory yield and throughput.

- Performed root-cause failure analysis and troubleshoot complex cross-functional technical issues.
- Pioneered the understanding of the effects that disk drive geometries have on HAMR optimization.
- Created a framework to rapidly benchmark reliability of new head and media designs that reduced learning cycle time by orders of magnitude.

## Electrical Engineer

FOSS North America

July 2010 – May 2011

Eden Prairie, MN

Develop and integrate automated process control systems for composition targeting and quality control in agricultural and food processing applications.

- Developed software applications in C# .NET to integrate measurement equipment and control systems with industrial equipment by communicating with Beckhoff IO modules via Modbus protocol.
- Integrated to SQL servers and Access DBs to store production results for ERP systems.
- Developed communication drivers for peripheral equipment such as label printers and bar code readers.

## EDUCATION

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### Master of Science in Electrical Engineering

University of Minnesota

May 2017

Minneapolis, MN

- Thesis: Effects of Radius and Skew on Areal Density in an HAMR Hard Disk Drive

### Bachelor of Science in Electrical and Computer Engineering

University of Minnesota Duluth

May 2010

Duluth, MN

- Minors: Computer Science, Applied Mathematics
- Senior Design: Variable Frequency Drive for Three-Phase Induction Motors
- Study Abroad: Waikato University, Hamilton, New Zealand

## PUBLICATIONS

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### Impact of Radius and Skew Angle on Areal Density in HAMR Hard Disk Drives

<https://doi.org/10.1063/1.5007725>

December 2017

AIP Advances

### Heat Assisted Recording: Advances in Recording Integration

<https://doi.org/10.1109/INTMAG.2017.8007625>

August 2017

IEEE International Magnetics Conference

### High Track Pitch Capability for HAMR Recording

<https://doi.org/10.1109/TMAG.2016.2614913>

October 2016

IEEE Transactions on Magnetics

### Radius and Skew Effects in an HAMR Hard Disk Drive

<https://doi.org/10.1109/TMAG.2015.2478115>

October 2015

IEEE Transactions on Magnetics

## PATENTS

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### Laser adjustment during field operation of a HAMR data storage device

U.S. Patent No. 9,589,587

### Determining a HAMR laser power that reduces adjacent track interference

U.S. Patent No. 9,536,559

### Adaptive HAMR laser power data storage device

U.S. Patent No. 9,478,248

### Procedure that achieves a target areal density for heat-assisted recording

U.S. Patent No. 9,330,688