Rain Hu

Senior Software Engineer — Semiconductor Device Engineer
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Professional Summary

Specializing in full-stack development, AI integration, and semiconductor yield improvement, with a strong understanding of system architecture and algorithms. Developed cross-database integration solutions and advanced data analysis tools, improving overall data processing and analysis efficiency by 40%. Pioneered semiconductor-specific visualization tools including wafer map, radius analysis, and bin-to-defect overlapping. Leveraged device knowledge to innovate the NWR Project, enhancing production yield by 5% for both 28eHV and 22eHV processes. Spearheaded the development of DSM Bot, an AI-powered assistant utilizing Retrieval-Augmented Generation (RAG) technology, revolutionizing information access and query efficiency in semiconductor manufacturing.

As a developer with comprehensive knowledge in both semiconductor technology and software development, I excel in creating ubiquitous language within organizations. This unique blend of expertise, combined with a deep understanding of system architecture and algorithms, positions me as an effective project leader, capable of bridging communication between users and developers. My ability to construct robust domain models and design efficient systems significantly contributes to successful Domain-Driven Design (DDD) implementation, enhancing project outcomes and team efficiency.

- **Ubiquitous Language Creator:** Facilitate clear communication across all levels of the organization
- **Effective Project Leader:** Bridge the gap between technical and non-technical stakeholders
- **Domain Model Expert:** Construct comprehensive domain models to support DDD practices
- **Cross-functional Communicator:** Enhance collaboration between users and development teams
- **System Architecture & Algorithm Specialist:** Design and implement efficient, scalable solutions

Core Competencies

- **Software Development:** C#.NET, React TypeScript, C/C++, Python, VBA, Java
- **System Design:** Clean Architecture, CQRS, Microservices, DDD, TDD
- **Algorithm & Data Structures:** Advanced problem-solving, optimization techniques
- **Database Technologies:** SQL, Oracle, PostgreSQL, Hadoop, ChromaDB (vector DB)
- **AI & Data Science:** Machine Learning, LangChain, RAG, Big Data Analysis
- **Semiconductor Expertise:** Device Physics, DRC, Layout Design, WAT, SPC, Yield Optimization
- **Tools & Technologies:** Git, Visual Studio, VS Code, Vim, Laker, Calibre, Docker
- **Languages:** Chinese (Native), English (TOEIC - 775/900), Korean (TOPIK I - 180/200)

Professional Experience

Senior Software Engineer — UMC — Tainan, Taiwan — 08/2022 - Present

- Led the development of UEDA 5.0, a multi-regional data analysis solution deployed across 4 manufacturing sites: (Taiwan, Japan, Xiamen, Singapore)
  - Implemented advanced data search, visualization, and analysis features
  - Developed a suite of specialized analytical tools including:
    - Bin to defect analysis
    - Killer ratio calculation
    - Flow comparison
    - Zone analysis
    - ANOVA (Analysis of Variance) analysis
  - Optimized query performance and integrated cross-database data, improving overall efficiency by 40%
  - Developed robust access control mechanisms to ensure data security across regions
- Pioneered the DSM Bot project, an AI-powered assistant for DSM-related queries
- Architected the BTV (Bin Test Validation) system, enabling WAT measurement conversion to bin data for backend yield rate monitoring through WAT
- Developed a suite of ChatGPT plugins, including APIs for real-time WIP (Work in Progress) lot status checks, enhancing production line visibility
- Mentored junior developers in advanced software architectures and best practices, improving team productivity by 25%
- **Languages and Technologies Used:** C#.NET, TypeScript, React, Python, SQL, LangChain

Device R&D Engineer — UMC — Hsinchu, Taiwan — 08/2018 - 08/2022

- Innovated the NWR Project, optimizing device isolation and enhancing yield rate by 5% on both 28eHV and 22eHV production
- Developed the Co-cut Project, a computer-assisted layout optimization tool that reduced experiment costs by over 50%
- Created U2C, a tool for translating between different DRC languages, reducing CAD development time by 30%
- Conducted cutting-edge research on eHV applications, contributing to advancements in OLED and Display IC technologies
- Optimized WAT analysis and test-key layout design, improving overall product quality and reliability

Education

MS in Material Science and Engineering — National Tsing Hua University — 2014 - 2018

- GPA: 3.97
- Thesis: Production of Graphite from Catalytic Liquid Cast Iron Bath

BS in Material Science and Engineering — National Tsing Hua University — 2010 - 2014

- GPA: 3.61

KEY PROJECTS

- **DSM Bot:** Pioneered an AI-powered assistant for DSM queries, revolutionizing information access in semiconductor manufacturing.
  - **Tech Stacks:** C#.NET, React TypeScript with Tailwind CSS, RAG (Retrieval-Augmented Generation)
  - **Architecture:** Clean Architecture, CQRS
- **UEDA 5.0:** Led the development of an enterprise-wide integrated database software, implementing advanced data visualization and AI-driven analysis capabilities.
  - **Tech Stacks:** C#.NET, Spotfire SDK, WinForms
  - **Architecture:** Clean Architecture, DDD
- **NWR Project:** Innovated a novel method for device isolation optimization, enhancing yield rate by 5% on both 28eHV and 22eHV production.
  - **Tech Stacks:** Python, Laker, Calibre
  - **Techniques:** DRC, Boolean Operations
- **U2C Project:** Developed an intelligent tool for translating between different DRC languages, facilitating seamless collaboration between design and manufacturing teams.
  - **Tech Stacks:** Python, VBA
  - **Techniques:** DRC, Boolean Operations
- **Others:**
  - 22eHV Share Implant Project
  - Co-cut Project (DRC)
  - BTV Project (C#.Net, Spotfire SDK)
  - UGPT API Plugins (C#.Net API)
  - KPlug(Klayout extension) (Python)
  - DocViewer (C#.Net Blazer)
  - Spotfire Auto Package Builder (C#.Net WinForms)
  - IDAS+ (VBA)