Resume: Justin Reina
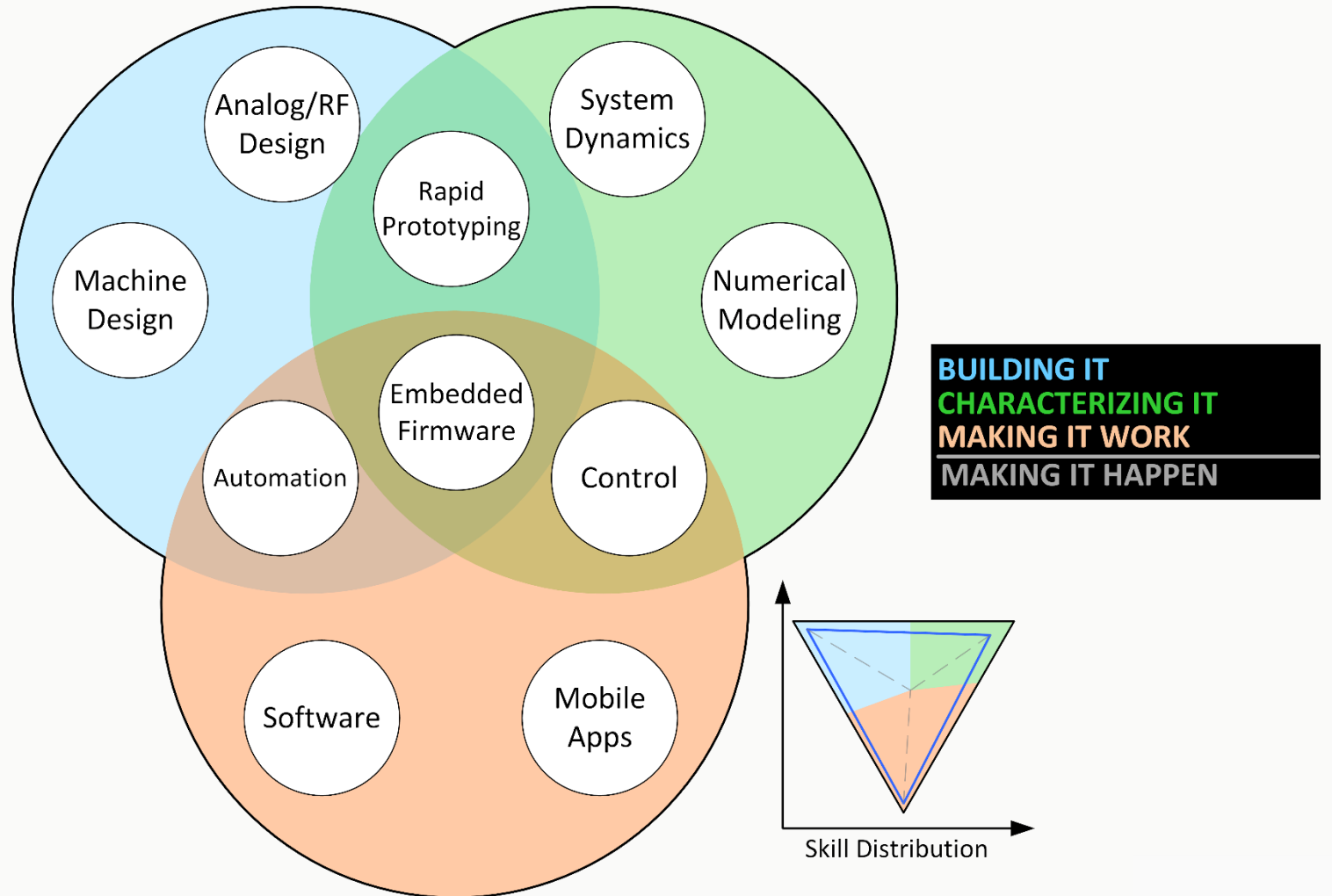
- justinreina.com?resume

An established & mature, diverse skillset covering your development needs

<u>Work Samples:</u>

1. Design Verification

2. Design Validation

3. MVP Generation

4. High-Volume Firmware

5. New Product Generation

Skillset & Experience Map

Analog/RF Design · System Dynamics · Rapid Prototyping · Machine Design · Numerical Modeling · Embedded Firmware · Automation · Control · Software · Mobile Apps

BUILDING IT
CHARACTERIZING IT
MAKING IT WORK
MAKING IT HAPPEN

Skill Distribution

Case Study: Design Verification

At Intel after helping identify & establish the device operating conditions, a design specification was born. Which also needed verification, where a regression was established to show protocol compliance and prepare for design transfer to OEM. I was given the chance to lead each step of this process, where we were successful in design establishment and verification of the needed customer performance results.
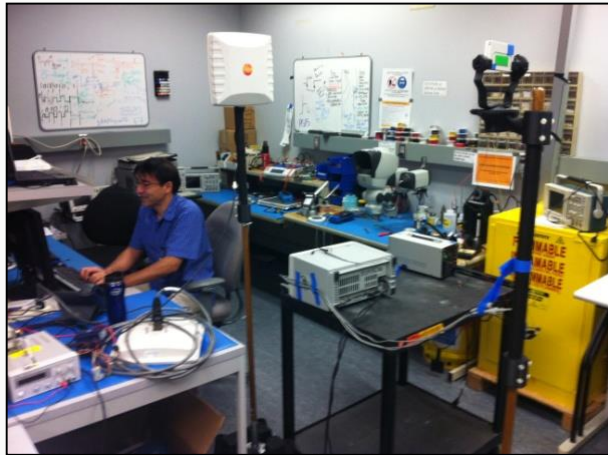
Here I established a diversity to test operating conditions, varying performance parameters and equipment (e.g. 11 separate RFID readers) to establish compliance and confidence in the new design. Here I focused on using reliable apparatus with extended margins to test parameters, establishing confidence in the new design.
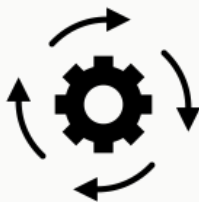
| Needs Translation | Design Identification | Test Variety | Test Coverage |

Testing Concepts

Automation   **Report & Description**   **Equipment Diversity**   **Transferable Solution**

Solution Benefits

01/ Needs Compliance

Identification of customer requirements with confirmation & record

02/ Uncertainty Mitigation

Extending test coverage with no assumptions, providing testing margins with extended performance visibility to establish confidence in the new design

03/ Complete Coverage

Full coverage of protocol specification and required operating conditions

04/ Automation

Automated test with record portable off-site, to OEM and external certification operations when needed

Case Study: Design Regression

The tests to prove protocol conformance and validate product operation where adapted to an automated & automated test suite written in JAVA & LabVIEW, providing full test automation providing detailed result reports (txt/csv) & standardized logs for reliable post processing. The regression was successful, covering multiple RFID readers and confirmed against existing industry RFID tag competitors. The regression suite & apparatus was extended for use to Intel in another state, to the OEM and further to the Contract Manufacturer for use.

The RFID tests were adapted to a selection of test environments including Intel Labs test facilities in Oregon, Intel ISG RF chamber facilities in Arizona, parking lot roadway testing at the OEM in Itajubá Brazil & end of line testing at the Contract Manufacturer in Campinas, Brazil
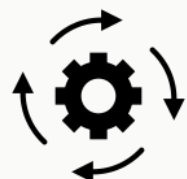
Complete Test Automation   **Standardized Report & Logs**   **Equipment Variety**   **Remote Test Support**

Technologies used

ISO 18000-6C & Siniav RFID Readers   **RFID Antenna Selection**   **Spectrum Analyzers & Power Meters**   **3D-Printed Test Apparatus**

Product Benefits

01/ Product Confidence
Securing certification and ensuring compliance with agreed customer timeline requirements

02/ Uncertainty Mitigation
Coverage to test edge cases and prepare for uncertainties in pending customer equipment updates (e.g. new RFID readers or protocol updates)

03/ Repeatability
The large audience over multiple locale, operations and languages required standardization and clarity of presentation, and was successful here.

04/ Reliability
Having a system independent of the operators or external components (e.g. test roadway or vehicles) proved a cost and time efficient benefit for the OEM transfer with this solution.

# Case Study: Firmware Development

Architect & lead developer for this work, Justin was responsible for system architecture identification, interrupt mapping & prioritization, protocol timing & response and full coverage of the new memory map specification meeting all testing, power and environment requirements

```
push    %edi
mov     $0xffffffff,%ecx
mov     $0x0,%eax
mov     0x8(%esp),%edi
cld
repnz scas %es:(%edi),%al
mov     $0xfffffffe,%eax
sub     %ecx,%eax
pop     %edi
ret
```
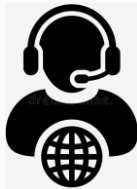
Timing compliant into RISC assembly as needed, all specifications & test compliance was readily achieved for this work. Sequence of operations identification with uncertainty identification & response helped deliver this to product quickly, and with low need for revision
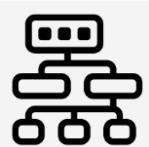
Architecture   **Timing & Security**   **Support & Release**   **Product Roadmap**

Technologies used

Code Composer Studio   **TI MSP30F2274**   **Coin-cell Operation**   **Ultra-low power performance**

Solution Benefits

01/ Simplicity

Coverage of many requirements with a clean & consistent format unified the firmware for deployment & field testing efficiently

02/ Clarity

Clear system design, implementation & publication enabled efficient & clean interactions with Intel team on other campuses (Arizona, São Paulo)

03/ Flexibility

Firmware flexibility supported coverage for new protocol specification (Siniav) and adaption to subsequent (Artesp) enabling new product creation

04/ Reliability

Remote release for high-volume, successful battery powered identification device

Case Study: Remote MVP Productization

In 2010 the work of Justin's research lab, prof. Joshua Smith's Sensor Systems lab generated a new client of interest for Intel Capital, who reached out with need to create a new high-volume, FIPS & ISO compliant, RFID tag for a remote international market. This was brand new, with Intel Capital reaching out to Justin as the lead of embedded systems development & firmware development of prof. Smith's WISP – "How do you do this? They want it now" and we got started
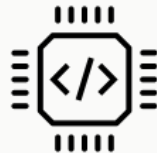
Justin provided what was needed, starting with translation of the new 46 page protocol specification to English & mapping this to product requirements & constraints. Justin was successful leading this project through all stages, from PoC -> Prototype -> Testing - > MVP -> Release & Support.

Needs Identification **Design Specification** **Firmware** **Certification Support**

Leadership Roles

Design Specification   **Prototyping**   **Testing**   **Certification & Release**

Customer Benefits

01/ Clear Description

Manufacturable Design portable through Intel Labs -> Intel Product Team -> Autofind (Brazil OEM) -> Flextronics (Brazil Mfg.)

02/ Reliable Design

Firmware was created with clarity, needs satisfaction and simplicity promoting a robust design for deployment and support

03/ Testable Solution

Firmware supporting multiple log & testing components providing reliable, and simple testing interfaces for local & remote operators

04/ Ownership for Delivery

Certification & Customer interface, and liaison to mitigate unexpected needs or issues that arose

Case Study: New Product Creation

Ergsense started with an existing customer where a question was raised, "How efficiently do they monitor operations?" quickly revealing an opportunity to improve the customer's existing portfolio solutions. The Optimyze idea was born, with Ergsense hired to form and deliver this prototype for manufacturing release.
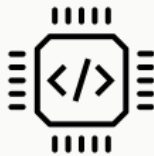

Justin led engineering efforts for prototype identification developing and delivering the original system design. This presented a hardware design which he then specified, designed and produced, revealing a stacked, multi-processor system design.
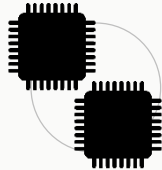
Design & Specification	Multi Processor	Firmware	Design Transfer

Technologies used

EAGLE PCB & Schematic

STM32 F0 MCU Microprocessor

RS-485, WiFi & Bluetooth Support

Multiple Sensors

Customer Benefits

01/ Full Sensing Coverage

Identification of need & potential was provided by Ergsense, securing a reliable design implementing further monitoring & maintenance support

02/ Adaptable Design

A multi-processor, stacked design was selected to mitigate open customer interests and design uncertainties

03/ Bluetooth On-site

Local Bluetooth connection allowed onsite inspector & maintenance support

04/ Remote Interfaces

Remote RS-485 & WiFi interfaces allowed for device description, inspection & notification support