

Nathan Vander Wilt

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Freelance software developer 2012-present

Caretaker in the design, architecture, and implementation of web/native/embedded software. Willing and able to **dive deep into nearly anything** needed to deploy a reliable interface.

I am active on GitHub and StackOverflow. An extensive list of projects, sampling the people/technologies/skills involved, is detailed in subsequent pages. References available on request.

Prior official roles (More recent freelance work on following pages)

Room to Think - Treasurer 2012-2014

Board member on the Tri-Cities' first coworking space, organized as a not-for-profit WA corp. Maintained books and accounts payable/receivable, guided future direction of community.

&yet - Senior Developer, Interim CTO 2010-2012

Led web/iPhone team for major client in the location tracking and telemetry industry. Researched and developed libraries in support of realtime single-page web apps.

Calf Trail Software - Co-founder 2008-2010

Designed, developed and personally supported several independent Mac shareware products. Authored company website and blog. Guided graphic design and iPhone development.

NOAA/NWS, Orion Network Solutions - Subcontractor 2006-2007

Automated map generation for visualization of updating and static hydrology datasets. Implemented geometry and labeling algorithms in support of basemap generation.

Dordt College Technical Support Services - Workstudy 2003-2006

Facilitated sound, lighting and projection for twice-weekly chapels. Recorded concerts in auditorium. Operated live video cameras. Stage managed and set up special events.

Inspiration Hills Summer Camp - Videographer/Worship Leader 2004-2005

Filmed and produced videos on weekly deadlines. Coordinated chapels and led singing. Maintained facility's computer systems.

Activities and interests

My office has been the cabin of a 30' wooden boat (still convalescing in our backyard). I read a lot and enjoy writing as well. My wife and I have three sons and I treasure doing projects in the garage workshop and/or the "electronics lab" upstairs with them. I also dabble in gardening (with chickens, rabbits, fish and even snails and crickets at times), play a variety of musical instruments, do ~~balloon~~ (now drone) aerial photography, go boating and camping, and periodically travel to see family.

Compendium of client projects

2025–2023 NOTE: all dates approximate, some projects spanned multiple years

Pacific Northwest National Laboratory, a Department of Energy research facility
embedded firmware and macOS projects

÷ ongoing **IoT** and **IT** staff augmentation work including everything from **NFC drivers** and **smart card** protocols, to **contract discussions** and **roadmap planning**. some **Rust** for **MSP430** trials, porting **C++/ARM** drivers to 16-bit, preparing for an **STM32 RTOS** migration

Inquirium, an educational software consultancy

re-deploying Project READI's "SenseMaking" on a new server

÷ server provisioning, **Ansible** for "gitops", **docker-compose**-based push-to-deploy mechanism

extending UChicago Impact's "To&Through" and "5Essentials"/"Cultivate" data tools

÷ including **Preact** and **modern CSS**, Django **backend** customization, **legacy code** extension and maintenance, engineering **PDF rendering** pipelines

Code4rena, a competitive smart contract security platform

led a small team of developers through a transitional period, continued providing behind-the-scenes system design, urgent incident responses, and software development mentorship

÷ code **quality**, organizational **restructurings**, dynamics of software **development teams**

Protocol Labs, an open-source software research and development company

development, research, and consultation with Web3 Storage UI libraries and underlying authorization protocol implementation

÷ **IPFS** ecosystem, **team growth** around **HTTP** standards, **authentication protocol** design

2022–2020

Pacific Northwest National Laboratory

low-level development and general support of embedded firmwares targeting multiple hardware variants of a GPS-enabled IoT device platform

÷ embedded systems (**MSP430** and **MSP432**) including **schematic review** and **electronic circuits** troubleshooting, **technical writing**, **proposal development**

Inquirium

ongoing development of various data and classroom-oriented tools including **information design** feedback, content **proofreading**, and dynamic **user interface** implementation

MCCGLC Ltd, a creative agency delivering immersive exhibitions

creating a tricky visual layout algorithm and helping a staff coder integrate it into their app

÷ animated **trigonometry**, algorithmic **efficiency**, developer **instruction** and **collaboration**

2019

Pacific Northwest National Laboratory

consultation re. a firmware project and evaluation of future roadmap

✦ **project collaboration, code review, technical writing, proposal development**

Inquirium

redesigning Project READI's "SenseMaking" app for in-classroom reading/notetaking/analysis

✦ efficient **refactoring** of an old **D3.js** codebase towards combined **preact/D3.js** usage, implementing mockups as **LESS/CSS**, maintaining **node.js** and **CouchDB** backends

Labbeemint, premier supplier of mint oils

provided on-call troubleshooting for mission-critical legacy interface, and participated in project handoff for its web-based replacement system during a major development team transition

✦ **technical support, Visual Basic and SQL Server/ERP integration, Rails and Ember.js**

Krekeltronics, a product design studio

research and preliminary prototyping for a Windows wrapper around a PWA with additional native network discovery needs

✦ **node.js, WinRT APIs, Capacitor framework and Electron runtime, dns-sd library evaluation**

Inquirium

worked out an interactively-animated landing page for a new UChicago Impact product

✦ converting complex **SVG** resources to data-driven **React** components, handling complex layout via **DOM Events** and **CSS**, advanced **LESS mix-in** design, browser compatibility

2018

Grant project supporting Baltimore City Public Schools

in collaboration with a skilled graphic designer, converted several paper surveys into a clean mobile interface delivered as an offline-first Progressive Webb App for in-field data collection

✦ **full-stack architecture, preact.js and webpack**, deployment to **Google Cloud** and **Google Sheets API** integration, **project planning**

Pacific Northwest National Laboratory

contract development of a new Mac app meeting diverse IT department objectives

✦ low-level **macOS development** in **Swift**, including with **XPC** and **app sandboxing**, web **API integration, shell scripting**, tooling for **smart card** infrastructure, technical **project management**

[2018 projects continue on next page...]

Inquirium

implemented a new app design for an upcoming data exploration tool related to UChicago Impact's 5Essentials product

÷ **code reuse** and **architecture** evolution of **React.js/redux/reselect** frontend, more **SVG** data visualizations and **event-driven animation**, more **Django** and **Python** data processing, **LESS/CSS** maintenance

Krekeltronics

integrated an in-house audio framework and a client-provided DSP library into a new iOS app, various other technical assistance on team projects

÷ **Swift**, digital **audio processing**, maintaining someone else's **Objective-C** codebase, integrating **C/C++** build processes in **Xcode**, troubleshooting **CoreAudio** integration

2017

Inquirium

webapp lead for redesign of UChicago Impact's "5Essentials" survey analytics tool

÷ **React.js/redux/reselect** frontend using **ES2015** syntax, **interactive SVG** data visualizations, **Django** views, **Python** data processing

AstroHQ, the company behind the Astropad tablet software for iPad

low-level R&D into the macOS graphics system

÷ **x86-64 disassembly**, **DTrace**, **kernel driver development**

Pacific Northwest National Laboratory

staff augmentation for IT user experience improvements

÷ **Linux/Apache/PHP** deployment, **shell scripting**, **macOS app development**/debugging in **Swift**, macOS internals and **AppleEvent scripting** interfaces, enterprise wireless **network configuration**, **documentation** and **source control** assistance)

2016

Flex Rental Solutions, providing inventory management for the A/V industry

helped finish an in-progress iPad/iPhone app release after its original developer left

÷ **debugging**, **Objective-C**, **iOS** development, working with **other people's code**

TiLite, makers of custom-fit titanium wheelchairs

worked through &yet with a small team on a tight deadline to develop a cutting-edge iPad app and server API, including physical prototyping

÷ **user experience**, **R&D**, **OpenCV**, **Swift/C++** integration, **JavaScriptCore**, **teamwork**

[2016 projects continue on next page...]

AstroHQ

helped integrate my macOS multitouch library under license into their iOS and Mac apps including some updates and improvements

✦ **macOS HID internals, Objective-C**

2015

Filament, developers of secure wireless network devices

helped test IoT hardware prototypes via custom firmwares developed, provided feedback/troubleshooting/documentation on an early Telehash implementation

✦ **embedded ARM** development, **electronics** rework, **protocol development**, **RF** testing, **documentation**

BrandCraft Media, digital marketing and web design firm

made a custom widget to display seasonal fruit availability on one of their client's websites

✦ **WordPress** plugin creation, **time/date** calculations, **PHP/HTML/CSS** code, **quick turnaround**

Inquirium

frontend developer for UChicago's "To&Through" data browsing tool from initial implementation and through a significant later revision

✦ **architecture**, **custom Django middleware**, develop **Django template addons** for **SVG generation**, **jQuery/Bootstrap/LESS** frontend, **refactoring**

2014

Viking Digital, manufacturer of electronic "modchips" for gamers

built an API for storing/sharing data from an online editor tool, built system for integrating website to physical controllers via a cross-platform app, extended MCU bootloader to support encrypted updates to help protect client IP

✦ **node.js**, **CouchDB**, **Electron** precursor native app, **binary data formats**, **USB driver** and **embedded PIC** development, **cryptography**

Couchbase, mission-critical data platform provider

helped tie together a "CouchTalk" P2P/syncing demo application ahead of a marketing event

✦ early **React.js**, early **Couchbase Lite** and **Sync Gateway**, deployed on **Android** and **iOS**

Technical Machine, creators of the Tessel JavaScript IoT platform

helped port NRF24 wireless transceiver to Tessel platform, implemented SD Card and FAT32 filesystem driver from scratch, implemented JS-conformant Unicode behavior for Lua transpiler system, helped build system for remote code deployment and workaround wireless network chip issues

✦ **node.js hardware drivers**, **embedded ARM** development, **Unicode**, **networking protocols**

Client projects, continued...

2012–2013

Jituzu, a client portal service for healthcare providers

collaborated with team to overcome miscellaneous technical obstacles blocking launch of early version of a new mobile app

✦ **Ember.js, Cordova, troubleshooting and training**

Argyle Tiles, personal startup

began processing aerial imagery and built a service to host unified "slippy map" tiles from multiple data sources, promotion and market research

✦ **node.js, image processing, GDAL, cartographic projections, public datasets, Amazon Web Services, marketing and intern mentorship**

Meograph, a four-dimensional storytelling startup

assisted with some web map expertise, re-architected multi-faceted media player for more stable playback, worked around Google Earth and YouTube player integration issues

✦ **CoffeeScript, collaboration, integration**

Inquirium

primary developer and design contributions to several iterations of Project READI's "SenseMaking" app for reading/notetaking

✦ **CouchDB and node.js backend, D3.js frontend, low-level DOM manipulation in support of student highlighting, many CSS tricks and mobile web multitouch compatibility**

Recon Dynamics, wireless asset management corporation

some continued support of the mapping platform I had helped develop via an employer

✦ configuring **VirtualBox, GDAL, customer service**. Earlier: **Django, OpenLayers, multitouch, Tropo/Twilio** integration

2010

Tracking startup in Yakima

helped a local entrepreneur explore feasibility of a cellular-based GPS fleet tracking service, using/debugging their procured off-the-shelf hardware and prototyping simple web app

✦ Online **mapping**, easily-hosted **PHP** backend, **GPS** technology, **SMS** gateways and cellular fee structures, **troubleshooting**

Personal/open source project highlights

fermata

A lightweight and clean library to build URLs, make HTTP requests, and parse the results.

✦ **node.js**/browser, low-level **HTTP** protocol, **REST** concepts, **API design**, advanced **JavaScript** features

PeerPouch

An experimental plugin for peer-to-peer syncing of PouchDB databases between browsers.

✦ early **PouchDB**, **CouchDB** replication, using **WebRTC** data channels, RPC handling

ShutterStem

A long-term personal project, creating a self-hosted photo management "app platform".

✦ **UI design**, advanced **JavaScript/browser** techniques, Python and other supporting utilities, handling **EXIF** data, **digital asset management**, **GPS data** management, and much more

js-cnc

Work-in-progress UI and backend for web based operation of a (grbl-based) CNC system.

✦ processes raw **G-code** via a **custom parser**, **computational geometry** for display/transformation, control over **USB serial** protocol, current backend via **node.js streams** although also researching **ChromeOS** deployment

Metakaolin

Proof-of-concept "modeless" UI to draw shapes on a map, saved in a self-hosted database.

✦ **UI design**, **web mapping**, computational **geometry** and basic **graph theory**, **multitouch** event processing, **cross-browser** implementation, **GeoJSON**, **CouchDB**

fatfs / sdcard / struct-fu

Pure-JS implementations of the FAT filesystem and signal-level driver for the SD Card interface. Also designed a standalone library for clean handling of the binary data structures involved.

✦ **filesystems**, **hardware** integration, **buffer** manipulation, **API design**

node-nrf

Pure-JS implementation of a nRF24L01+ wireless transceiver driver, exposing a high-level interface on top of the low-level low-level command/interrupt handling which I implemented.

✦ low-level **chipset protocols**, **node.js streams**, **hardware troubleshooting**

Other contributions

During the course of my work, I proactively file issues and submit patches to "upstream" libraries as appropriate. On occasion I've taken over responsibility from the original authors.

✦ patches contributed to: D3.js, preact, node-hid, node-cookie-signature, browserify, django-pipeline-browserify, tessel-runtime, pouchdb, WebKit, and others

Past speaking opportunities

Full Stack Tri-Cities (Richland, WA) — Deep Dive on Building Alexa Skills, explaining the system and showing some example skill development

MakerLand 2016 (Seal Rock, OR) — "Workshop: All About Radio", an introduction to RF communication fundamentals and Software Defined Radio

CascadiaJS 2013 (Vancouver, BC) — Building apps with D3.js

"D3 is well-known as an SVG visualization library, but can provide a powerful platform for building entire DOM-aware frontend applications."

video: https://www.youtube.com/watch?v=hhSIX_r7GZA

Apache CouchDB Conf (Vancouver, BC) — Personal Web Apps

"CouchDB is great at keeping track of all sorts of personal data — everything from notes and contacts, to sharing a live stream of photos from a balloon 250 feet above a construction site. I'll demo of some of the more interesting apps I've been building for my 'personal cloud' and talk about the CouchDB features which make them easy. We'll also explore what CouchDB doesn't do and how to get those things done anyway."

video: https://www.youtube.com/watch?v=4QttTEbQ_1I

slides: http://n.exts.ch/2014/02/couchconf_slides

State of the Map US 2012 (Portland, OR) — Building the Other Tab: Satellite Maps for Your App

"Take a behind-the-scenes look at how we made Argyle Tiles, a tile service hosting a remix-friendly global satellite/aerial map layer. Get an overview of what it takes, learn which datasets and tools we use, and explore how you could build something like it on your own."

CouchConf 2012 (Portland, Seattle) — Scaling geodata with MapReduce

"While Couchbase's support for spatial indexing is a powerful feature, certain geodata patterns fit well within the MapReduce paradigm. We'll look at some example views that stretch the potential of a single-dimensional index (and leverage its scalability) for geographic datasets. [Also including:] reasons to use a spatial index for non-geographic data."

slides: http://n.exts.ch/2014/02/couchconf_slides

TriConf 2011 (Richland, WA) — Shipping tips: Habits, Strategies, Tactics (and Reasons) for shipping software.

Institutional and continuing education

Bachelor's Degree - General Metaphysics

Dordt College, Sioux Center, Iowa (May 2006) — graduated a year early

"Amateur Extra" radio license (AF7TB) — passed all three exams at one sitting in 2015

"GROL" Commercial Operator radio license (PG00060621) — obtained in late 2018

"Quantum Mechanics for Everyone" (course certificate) — passed EdX course in early 2019

"Building Blocks of a Quantum Computer, pt. 2" (course certificate) — EdX course late 2019