Christopher Reidy

Contact

www.chrisreidy.ai
christopher.reidy@gmail.com

781-835-0074

1407 176th Ave NE
Bellevue WA 98008

LinkedIn

Skills

Coding
MATLAB, Python, C++, Simulation Tooling, parallel compute, distributed compute, multi-threading, CUDA, GPU Compute, LabView

Display/Camera/Image Quality
ISP & Display Pipeline Architecture, Tone & Gamut Mapping, Warp Mesh, Gamma, EOTF, Human Perception, Colorimetry, Metrics, LCOS, µLED, Lasers, Calibration, Metrology, c-phy, d-phy, Zemax, Compression, Convolution, FFT, eye-tracking, MTF & Distortion Analysis, waveguides, surface relief gratings, Graphics, Rastering, Raycasting, Subpixel Rendering, DSP

Profile

Innovative engineering leader with a Ph.D. in Physics & 10+ years building advanced AR/VR display systems at Meta, Apple, and Microsoft. Specialized in display pipeline architecture, simulation tooling, hardware/software co-design, and perceptual image optimization. Proven ability to lead cross-functional teams and drive novel technology from concept through implementation

Work Experience

Principal Optical Systems Engineer

Meta 2020 - 2025

Defined display correction pipeline architecture for Meta's AR products, including ground-up design for next generation systems

Lead executive display architecture review – secured funding to develop multiyear tech roadmap.

Arch review led directly to display bit depth, µLED pitch, resolution, field of view selection for project Orion, as well as Meta's future augmented reality products

Lead development of end-to-end display simulation software. From graphics renderer-to-eye, including Si HW models, firmware, display panel, projector, waveguides, and quantitative image quality analysis

Developed GUI for simulation tool, allowing design and UX teams to quickly model display/optics impacts to user experience

Developed software into command line tool, allowing optical modeling to be integrated directly with other tool sets. This allowed my software to run on a distributed compute system with 10,000s of cores for high fidelity video simulations

Lead team to deliver perceptually optimized tone/gamut mapping algorithm in concert with Perception Science and UX teams. Algo made directly compatible with all of Meta's display products, optimized bit depth and node size for low power

Developed novel waveguide uniformity correction algorithm, resulting in step change improvement

Worked with graphics research team to build novel sub-pixel aware renderer. In addition, developed sub-pixel aware convolutional filter for improved quality for arbitrary pixel layout

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Education

Ph.D. Physics

Oregon State University

2009 - 2018

B.S. Physics

Univ of Mass - Lowell

2005 - 2009

Work Experience

Senior Display Pipeline Architect

Apple 2018 - 2019

Ownership of display correction algorithms for Apple's augmented reality display program. Definition of hardware specs to support display requirements. Collaboration with FPGA/ASIC teams to implement my work in silicon. Creation of novel display concepts and prototypes with panel and optics team

Developed low perceptibility spatio-temporal dither algorithm for unique display, reducing bandwidth requirements and system power consumption while maintaining perceived image quality

Created low latency background correction feature to mitigate visibility of ambient environment in unique display

Created low power digital drive scheme for unique display, outperforming previous solution by 3x

Extended multivariate human contrast sensitivity model used to guide design of Apple's displays and algorithms. Reduced user studies needed for algorithm validation/predict algorithm performance in future displays

Opto - Electronic Engineer

Microsoft 2015 - 2018

End-to-end ownership of design, measurement, and simulation of multi-emitter quantum well diode lasers. Worked with external partners to fab designs and iterate based on experimental data

Developed unique coherence reduction strategy, solving laser & waveguide interaction issues

Designed, built, and programed entire laser characterization infrastructure for Microsoft HoloLens 2

Ownership of module & component level test plan to be executed by external suppliers

Designed and built temperature resolved boresight measurement system with < 1 arcsec resolution for Hololens 2 projector assembly

Developed module level MTF measurement used by external supplier in production

Engineered and constructed transportable scanning camera system (~1m^2 image) for projector uniformity measurements

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Patents

Improved Waveguide Correction Algorithm
C. Reidy, E. Buckley, filed 1/10/2023, pub. 7/11/2024
(Pending US20240233614)

Combined Tone and Gamut Mapping for Augmented Reality Display
P.C. Huang, E. Buckley, C. Reidy, Y. Asano, R. Zhang, pub. 6/20/2024
(Pending US20240202892A1)

Multi-Section Laser for Fast Modulation and Broad Spectral Linewidth
C. Reidy, K. Zang, R.K. Price, filed 10/2/2018, granted 3/9/2021
(US10944240)

Fringe Mitigation using Short Pulse Laser Diodes
C. Reidy, S. Shahin, K. Zang, R.K. Price, filed 6/8/2018, granted 9/14/2021
(US11119320)

Hybrid Depth Detection and Movement Detection
R. K. Price, M. Bleyer, C. Reidy, filed 3/22/2018, granted 11/12/2019
(US10475196)

Movement Detection in Low Light Environment
R. K. Price, M. Bleyer, C. Reidy, filed 3/22/2018, granted 7/28/2020
(US10728518)

Electrocardiogram (EKG) Indication Saturation Correction
H. Albadawi, C. Reidy, J. Liu, filed 11/15/2016, granted 6/11/2019
(US10314504)

Conferences & Community

IS&T: Invited Workshop: Display Simulation Pipeline for Augmented Reality
CIC32, Montreal QC 10/29/2024

SID, Display Week Executive Committee **Showcase Chair**
Display Week 2025, San Jose CA