PHILLIP
HAMPTON
EWING, JR.

(redacted)
phewing@alum.mit.edu
www.phillipewing.com

SUMMARY

Cross-disciplinary designer, researcher, and educator exploring software and devices for creating environments that (1) improve users' health, (2) promote wellbeing, and (3) enhance cognitive performance, by applying knowledge and experience from:

DESIGN · 3+ years of work at internationally-recognized design firms and labs; experience and knowledge across multiple domains, including architecture/interiors, graphics, experiments and surveys, software, as well as electronics.

RESEARCH · Leadership and publication of multiple projects ranging from architectural robotics to workplace wellness, with specialized expertise in light and human circadian rhythms.

PROGRAMMING · Development of simulation tools and applications for building performance analysis using Python, JavaScript, C#, R (among other languages) and version management tools (Git, Mercurial).

FABRICATION · Project experience with a broad range of digital prototyping workflows, including printed circuit board (PCB) layout and fabrication.

TEACHING · Lectures, workshops, and curriculum for architecture programs at multiple universities.

EDUCATION

Massachusetts Institute of Technology (MIT) · Cambridge, MA
Master of Science In Architecture Studies (SMArchS), Design and Computation · 2015

THESIS · *Interactive Phototherapy: Integrating Photomedicine intoInteractive Architecture*
CUMULATIVE GPA · 4.8 (of 5.0)

Auburn University · Auburn, AL
Bachelor of Architecture (BArch) · 2012
Bachelor of Interior Architecture (BIArch) · 2012

HONORS · *Magna Cum Laude*
CUMULATIVE GPA · 3.6 (of 4.0)

University of Alabama in Huntsville (UAH) · Huntsville, AL
(General Studies) · 2006-2007

CUMULATIVE GPA · 4.0 (of 4.0)

SKILLS

3D/CAD/CAE: 3ds Max · AutoCAD · Blender · Digital Project · Dynamo · EAGLE · Grasshopper · Inventor · Maya · Revit · Rhino 3D · SketchUp · SolidWorks

Analog Fabrication: Composites molding/casting · Microelectronics production · Model-making/prototyping · Plastics molding/casting

Building Simulation: ALFA · DIVA · Ecotect · EnergyPlus · IES VE · OpenStudio · Radiance

CAM: ABB Robot Studio · CNCjs · Fab Modules (MIT) · PartWorks 2D · SurfCAM

Digital Fabrication: 3D printing · CNC milling · Laser cutting · Vinyl cutting · Waterjet cutting

Libraries/Frameworks: Arduino SDK (C/C++) · Google Maps API (JavaScript) · Grasshopper SDK (C#, IronPython) · OpenCV (C++, Python) · TensorFlow w/Keras (Python) · Three.js (JavaScript)

Markup: CSS · HTML · Markdown

Media Creation: Dreamweaver · Final Cut Pro · Illustrator · InDesign · Inkscape · Photoshop · Premeire · Scribus

Programming/Scripting: C/C++ · C# · Java · JavaScript · LaTeX / BibTeX · Python · R

(Miscellaneous): bash · CMake · Git · HDF5 · libradtran · Mercurial · MS-DOS · Visual Paradigm (UML/SysML)

$$\overrightarrow{P_1} \in \mathbb{Z}^6$$

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RECENT EXPERIENCE

Perkins+Will · Atlanta, GA

Researcher, Neuroarchitecture Lab · May 2016 – Present

NEUROARCHITECTURE LAB · *(formerly Human Experience Lab)*

Circadian Light Tracker · Won and executed a firmwide "innovation incubator" research grant to design, fabricate, and program (Arduino SDK, C/C++) a wearable circadian light tracker equipped with 13 + 1 (spectral + photopic) light sensors, and presented project results to the Perkins+Will Atlanta office. (Publication and further development options currently being actively explored.)

Circadian Light Analysis · Unilaterally implemented a novel, proof-of-concept analysis tool ('pChroma') for simulating light exposure levels for building occupants according to five spectral photosensitivity functions (i.e., 'pentachromic' functions) recommended by the latest circadian photobiologic research. Successfully led publication and presentation of a conference paper detailing research & development work for the 2017 IBPSA (International Building Performance Simulation Association) Building Simulation conference (see Ewing et al. 2017).

Thermal Comfort · Reporting directly to the CEO (Phil Harrison, FAIA), led a team of four Neuroarchitecture Lab researchers in designing and deploying an online survey assessing employee thermal comfort in the Perkins+Will Atlanta office, as well as evaluating and reporting survey results.

Psychoacoustics · Worked directly with the Neuroarchitecture Lab director (Dr. Eve Edelstein) in deploying survey protocols for assessing speech intelligibility, ambient noise levels, and other psychoacoustic properties of spaces using industrial-grade sound level and noise dose meters, sound analysis software, and building occupant hearing tests (adapted from HINT and SIN hearing tests). Instructed Neuroarchitecture lab colleagues in conducting measurements and surveys.

ENERGY LAB

Simulation Platform for Energy Efficient Design (SPEED) · Collaborated as one of the primary software developers towards the successful beta deployment of SPEED: an online application for Perkins+Will designers to (1) easily create valid parametric models of common building geometries and envelope constructions, (2) run up to thousands of energy performance simulations per day on AWS machines running OpenStudio Server, and (3) review data visualizations and analytics of simulation results. (Firmwide release pending.)

DESIGN PROCESS LAB

Design Space Construction (DSC) · Collaborated with Process Lab researchers on the development of DSC, a tool and workflow for optimizing building design performance based on both quantitative (e.g., EUI) and qualitative (e.g., view quality) design performance indicators. Further collaborated on curricula, and other assorted materials explaining the (DSC) methodology for a workshop at the 2016 ACADIA (Association for Computer-Aided Design in Architecture) conference, 2017 and 2018 presentations at Autodesk University, and a 2018 journal article published in ITCon (see Haymaker et al. 2018).

Space Plan Generator (SPG) · Evaluated and advised algorithmic improvements to software developers for development of software tools (Dynamo C# SDK) of SPG, a set of Dynamo plugins for automated generation of floor plan design options based specification of program entities and adjacencies via spreadsheet input. Assisted in multiple internal workshops for instructing Perkins+Will healthcare planners on how to use SPG for generating floor plan options for client projects.

Client Projects · Applied the DSC methodology for advising multiple Perkins+Will project teams on building design performance and potential improvement strategies.

Teaching Initiatives · Contributed curricula and documentation for workshops on design space construction taught to graduate-level architecture students at the University of Washington (Seattle), as well as 4th-year architecture undergraduate students at Auburn University.

$$\overrightarrow{P_2} \in \mathbb{Z}^6$$

RECENT EXPERIENCE (CONTINUED)

BUILDING TECHNOLOGY LAB

Thermoplastic Robotics · Collaborated with Building Technology Lab (Tech Lab) and Autodesk BUILD space researchers in exploring designer-centric workflows for digital fabrication of thermoformed plastic structural systems using multiple, synchronized industrial robotic arms controlled via Grasshopper, Dynamo, and ABB Robot Studio.

GENERAL

"Stand Up to Work" Study · Assisted in executing a 12-month study of employees in the Perkins+Will Atlanta office, funded by the American Society of Interior Designers (ASID) and conducted in collaboration with the Center for Active Design, the Icahn School of Medicine at Mount Sinai, and Steelcase, on standing-desk usage in the workplace. Verified that 'on-the-ground' conditions complied with study protocols and communicated user survey instructions and next steps to study participants and local office management.

Gadget Lab · Operated, maintained, and debugged a variety of environmental testing and measurement equipment as part of an in-house 'gadget lab,' including: sound level and noise dose meters, handheld spectrometers, a distributed ambient temperature and relative humidity sensor kit (Pointelist), a smart flooring system, and other devices. Instructed research colleagues on equipment operation and advised on acquisition of additional measurement devices.

(Miscellaneous) · Developed Python scripts to automate tasks for literature search results analysis, light & sound measurement data presentation slides generation. Implemented quasi-Monte Carlo sampling for design of experiments (DoE) via interface with R, and a spectral daylight analytical model (Hosek-Wilkie) as Grasshopper components using the C# SDK. Implemented scripted automation of other administrative tasks using Python.

Changing Places Group, MIT Media Laboratory · Cambridge, MA

Project Assistant · April – May 2015

Collaborated with a team of graduate researchers and undergraduate students on architectural design for the third iteration of CityHome: a modular, "mix-and-match" kit of robotic actuators and sensors for creating transformable, intelligent living spaces.

Produced design development drawings, digital models (Rhino, SketchUp), and renderings (3ds Max) to refine development and presentation of a 350 ft² built apartment prototype.

Presented CityHome prototype (alongside project team) for an international audience of Media Lab corporate sponsor representatives and press during the Spring 2015 MIT Media Lab Members' Week.

Research Assistant · April – May 2015

Led architectural design in collaboration with a team of graduate researchers and undergraduate students for the second iteration of CityHome: a robotic furniture module for converting a 200 ft² micro-apartment space into a "smart home" with the functionality of a space "three times its size"; incorporates gesture, voice and touch interfaces for user control; and allows for further customization via downloadable "apps".

Produced schematic designs, 3D models (Rhino, Grasshopper, Autodesk Inventor), construction drawings, hardware mockups, and G-code files (CNC router, laser cutter, waterjet cutter) for the robotic wall unit exterior finishes, primary structure, and portions of the mechanical hardware.

Coordinated architectural designs with the mechatronics lead for the robotic systems.

Completed design and construction (alongside project team) of functional robotic wall unit and full-scale 200 ft² demonstration space in less than three months for live demonstrations during the Spring 2014 MIT Media Lab Members' Week.

$$\overrightarrow{P_3} \in \mathbb{Z}^6$$

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TEACHING EXPERIENCE

Auburn University · Auburn, AL

Guest Lecturer · August – December 2018

Developed and presented three lectures, three workshops, and assignments on building performance analysis using the Design Space Construction workflow (Grasshopper, EnergyPlus, Radiance) to the entire 4th-year architecture student body in "ARCH 2220: Environmental Controls II" (Instructor: Prof. David Hinson, FAIA). Reviewed and graded student assignments.

Guest Lecturer + Critic · June – August 2018

Presented two lectures on acoustics and lighting analysis to 4th-year undergraduate students in "ARIA 4030: Interior Architecture Thesis" studio (Instructors: Profs. Kevin Moore, Matt Hall, Lida Sease). Conducted two desk critique sessions and participated as a juror for midterm and final reviews.

Guest Critic · April 2018

Invited and attended as a design juror to review undergraduate thesis student projects for "ARCH 5020: Thesis Studio" (Instructors: Profs. Justin Miller, Randal Vaughn).

University of Washington · Seattle, WA

Guest Lecturer · October 2017

Co-presented a lecture and on circadian light analysis (Grasshopper, Radiance, Python) for graduate students in the seminar course "ARCH 526: Topics in High Performance Buildings" (Instructors: Prof. Chris Meek, Devin Kleiner, Heather Burpee) as part of a workshop on the Design Space Construction (DSC) workflow for building performance analysis. Co-wrote the documentation and instructions on running (DSC) workflow.

Guest Lecturer · October 2017

Co-presented a lecture on circadian light analysis (Grasshopper, Radiance, Python) and conducted desk critiques of projects for graduate architecture students enrolled in "ARCH 504: Graduate Design Studio" (Instructors: Prof. Chris Meek, David Kleiner).

Singapore University of Technology and Design (SUTD) · Singapore, SG · *and*
Massachusetts Institute of Technology (MIT) · Cambridge, MA

Research Assistant · June – August 2013

Developed a curriculum for an introductory class on Building Information Modeling (BIM) for the Singapore University of Technology and Design (SUTD; in collaboration as a 'sister' university of MIT), emphasizing BIM as part of a larger conceptual framework incorporating digital fabrication workflows and "digital twins" for building operation and monitoring. Produced semester-long course syllabus, content plan, and the first five weeks of: lecture outlines, step-by-step lab session instructions, digital models (Revit), and student assignments.

Auburn University · Auburn, AL

Guest Lecturer · August 2011 – May 2012

Developed teaching materials and instructed workshops on Rhino, Grasshopper, and design application interoperability for undergraduate and graduate architecture students. Advised on the development of additional digital media workshops.

Teaching Assistant · August – December 2010

Led lab sessions and evaluated student work for undergraduate students in "ARCH 1000: Introduction to Careers in Design and Construction" (Instructor: Prof. Tarik Orgen).

$$\overrightarrow{\mathrm{P}_4} \in \mathbb{Z}^6$$

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EARLIER EXPERIENCE

The Freelon Group · Durham, NC · *(joined Perkins+Will in March 2014)*

Intern · June – August 2012

Produced schematic design drawings, digital models (Rhino, SketchUp, Revit), presentation boards (Illustrator, InDesign) for multiple renovation projects and proposals, including: Martin Luther King Jr. Memorial Library (Washington, DC); North Carolina Museum of History (Raleigh, NC); John Avery Boys and Girls Club (Durham, NC).

Intern · May – August 2010

Created schematic design drawings, digital models (Rhino, SketchUp), physical models, and presentation boards (Illustrator, InDesign) for several higher-education and museum projects and design bids.

Produced presentation slides, diagrams (Illustrator), and videos (Adobe Premiere) documenting the office's portfolio of design work, including the Smithsonian National Museum of African American History and Culture (Washington, DC), the Harvey B. Gantt Center (Charlotte, NC), and other projects.

Worked directly with the company president (Phil Freelon, FAIA) on pre-design precedent studies and drawings for the Freelon > REACH exhibition (Wolk Gallery, MIT Department of Architecture; Cambridge, MA) and accompanying booklet, as well as design studies for a limited-edition coffee table (manufactured by Herman Miller).

PEC Structural Engineering, Inc. · Huntsville, AL

Intern · May – August 2007

Updated 'red-lined' revisions to construction drawings (AutoCAD), and assisted in on-site inspections and documentation of various municipal and single-family residential projects.

Bentley Systems, Inc. · Madison, AL

Intern · May – August 2006

Conducted tests on eWarehouse, an application for plant operators to manage maintenance of industrial equipment. Reported and tracked trouble reports and change requests via database (FlawTrack). Created MS Excel macros to organize trouble report and change request data.

AWARDS + RECOGNITIONS + AFFILIATIONS

STUDENT CATEGORY FINALIST (2014) · Fast Company Innovation by Design Awards (in collaboration with MIT Media Laboratory Changing Places Group team)

ROBERT R. TAYLOR FELLOWSHIP (2012-14) · MIT School of Architecture + Planning (SA+P)

HONORABLE MENTION (2012) · Pella Design Portfolio Competition, Auburn University School of Architecture, Planning, and Landscape Architecture (APLA)

1ST PLACE (2011) · Student Design Competition, National Organization of Minority Architects (in collaboration with Auburn University NOMAS competition team)

1ST PLACE (2011) · Blackwell Prize in Drawing & Painting, Auburn University APLA

FACULTY & STAFF AWARD (2011) · Auburn University APLA

1ST PLACE (2011) · Pella Design Portfolio Competition, Auburn University APLA

1ST PLACE (2010) · Architecture Writing Award, Auburn University APLA

COOPER CARRY ARCHITECTS ANNUAL SCHOLARSHIP (2009) · Auburn University APLA

DEAN'S LIST · Spring 2008, Summer 2008, Fall 2010 · Auburn University College of Architecture, Design and Construction (CADC)

$$\overrightarrow{P_5} \in \mathbb{Z}^6$$

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AWARDS + RECOGNITIONS + AFFILIATIONS (CONTINUED)

PRESIDENT (2011-12) · National Organization of Minority Architecture Students (NOMAS), Auburn University chapter

5TH-YEAR STUDENT REPRESENTATIVE (2011-12) · American Institute of Architecture Students (AIAS), Auburn University chapter

MEMBER · Golden Key International Honour Society, Auburn University chapter; inducted Spring 2009

MEMBER · National Society of Collegiate Scholars, Auburn University chapter; inducted Spring 2009

PUBLICATIONS

Haymaker, J., Bernal, M., Marshall, M. T., Okhoya, V., Szilasi, A., Rezaree, R., Chen, C., Salveson, A., Brechtel, J., Hasan, H., Ewing, P. H., and Welle, B. (2018). "Design Space Construction: A Framework to Support Collaborative, Parametric Decision Making." *Journal of Information Technology in Construction (ITCon)*, Vol. 23, pp. 157-178. URL: *https://www.itcon.org/paper/2018/8*

Ewing, P. H., Haymaker, J., and Edelstein, E. A. (2017). "Simulating Circadian Light: Multi-Dimensional Illuminance Analysis." Presented at International Building Performance Simulation Association (IBPSA) Building Simulation 2017 conference, San Francisco, CA, USA, August 7-9, 2017. URL: *http://www.ibpsa.org/proceedings/BS2017/BS2017_660.pdf*

Ewing, P. H. (2015). "Interactive Phototherapy: Integrating Photomedicine Into Interactive Architecture." Thesis: S.M., Massachusetts Institute of Technology (MIT), Department of Architecture. Advisor: Kent Larson. URL: *http://hdl.handle.net/1721.1/99275*

SUPPLEMENTARY LINKS

PERSONAL WEBSITE · *http://www.phillipewing.com*

LINKEDIN PROFILE · *http://www.linkedin.com/in/phewing*

CITYHOME VIDEO · *https://www.youtube.com/watch?v=f8giE7i7CAE*

LaTeX 2ε source code for CV available on GitHub:

https://github.com/phewing/phewing-CV

$\overrightarrow{P_6} \in \mathbb{Z}^6$