

## Kevin Tien

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(646) 205-0474 ext. 1101

### Research Interests

Power electronics; Integrated magnetics for power applications; 3D integration for high-performance processor systems; High performance control systems for DC-DC regulators; GaN-Si hybrid technologies for high-voltage and RF applications; High-level synthesis for SoC design

### Education

**Columbia University in the City of New York**, New York NY **2017 expected**  
Doctor of Philosophy: Electrical Engineering  
Researcher in Bioelectronic Systems Lab, under advisement of Prof. Ken Shepard

**Columbia University in the City of New York**, New York NY **2013**  
Master of Science: Electrical Engineering

**The Cooper Union for the Advancement of Science and Art**, New York, NY **2012**  
Bachelor of Engineering: Electrical Engineering, minor in math  
Summa Cum Laude

### Professional Experience

**Graduate Research Assistant in Bioelectronic Systems Lab** **Fall 2012 to present**  
*Columbia University: New York, NY*  
Developing fully-integrated buck converter circuits leveraging new power inductor topologies  
Researching buck control schemes with nanosecond response times, fixed switching frequency, and high scalability  
Researching hybrid GaN-Si packaging/design schemes for RF and high-voltage applications  
Developing design kits for specialised integrated power inductor, TSV, and GaN enabled technologies, including: models for power inductors, TSVs, and GaN devices; parametrised cells for layout; DRC/LVS rule decks, and parasitic extraction

**Contractor in Circuits Group** **Fall 2014**  
*Ferric Inc.: New York NY*  
Developed efficiency models for fully integrated voltage regulators  
Carried out design of time-optimal and bandwidth-optimal control systems for fully integrated buck converters

**Adjunct Instructor of Electrical Engineering** **Spring 2014 to present**  
*The Cooper Union for the Advancement of Science and Art: New York, NY*  
Courses taught: ECE445, Design of Op-amp Based Systems, ECE140, Circuit Analysis, ECE141, Electronics I

**Graduate Intern in Systems Power, Packaging, and Cooling Group** **Fall 2013**  
*IBM Research: Yorktown Heights, NY*  
Evaluated bleeding-edge power inductor designs in modern buck converter topologies  
Developed on-chip characterisation test sites for power inductors under high device stresses  
Developed novel control topologies for small inductance use cases

**Teaching Assistant for Digital Systems Laboratory Course, ELEN E3082      Spring 2013**

*Columbia University: New York, NY*

Helped undergraduate students attain proficiency with basic digital circuit topics  
Oversaw administrative concerns for three lab sections

**Teaching Assistant for Digital VLSI Course, ELEN E4321**

**Fall 2012**

*Columbia University: New York, NY*

Helped graduate students and advanced undergraduates understand large-scale digital system concepts

**Visiting Scientist in DiCarlo Lab of Quantum Transport Group**

**Summer 2012**

*Delft University of Technology: Delft, The Netherlands*

Designed a novel 3D superconducting multi-cavity-per-qubit quantum computer prototype  
Oversaw fabrication of readout resonator and performed preliminary RF characterisation

**Instructor for MATLAB Seminar, ECE110**

**Spring 2011, Spring 2012**

*The Cooper Union for the Advancement of Science and Art: New York, NY*

Designed and taught MATLAB course, focusing on signal processing and system analysis  
Covered topics including advanced vectorisation and efficient use of resources for big data

**Head System Administrator Emeritus in Elec. Eng. Labs**

**Fall 2009 to Spring 2012**

*The Cooper Union for the Advancement of Science and Art: New York, NY*

Responsible for several computer labs, department website, internal DNS, and DHCP  
Supported wide range of CAD tools (Cadence, Synopsys, Agilent, COMSOL etc.)

**Research Intern in Zhenan Bao Research Group**

**Summer 2011**

*Stanford University: Stanford, CA*

Developed part of process for thin-film organic transistor fabrication on flexible substrates  
Designed digital circuits for fabrication using developed process flows

**Researcher with S\*ProCom2**

**Spring, Summer 2010**

*The Cooper Union for the Advancement of Science and Art: New York, NY*

Implemented select SHA-3 hash function candidates in CUDA-C for performance analysis

**Student Technical Internship in Digital Systems Laboratory**

**Summer 2010**

*AT&T Labs: Middletown, NJ*

Designed internal web application for user-based database manipulation  
Designed test system for optical circuits (OC192, OC48) using Java, TL1, and SCPI

**Honours/Awards**

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**PhD Fellowship**

**2015**

*International Business Machines*

**PhD Scholarship**

**2014**

*International Business Machines*

**Graduate Research Fellowship Program Honourable Mention**

**2013**

*National Science Foundation*

**Leon Machiz Prize for Excellence in Electrical Engineering**

**2012**

*The Cooper Union for the Advancement of Science and Art: New York, NY*

<b>Second Place, IEEE Region 1 Paper Competition</b>	<b>2012</b>
<b>Second Place, IEEE RIT Student Design Contest</b>	<b>2012</b>
<b>IEEE Standards Education Committee Student Design Project Grant</b>	<b>2012</b>
Designed/fabricated hardware for use in visible light communications systems, e.g. linear LED modulators, RSSI circuits, and diversity receivers	
<b>Full Tuition Merit Scholarship</b>	<b>2008-2012</b>
<i>The Cooper Union for the Advancement of Science and Art: New York, NY</i>	
<b>School Honours</b>	<b>2008-2012</b>
<i>The Cooper Union for the Advancement of Science and Art: New York, NY</i>	
<b>Robert C. Byrd scholarship</b>	<b>2008-2011</b>
<i>US Department of Education</i>	
<b>Member, Tau Beta Pi</b>	<b>2010</b>
<b>Member, Eta Kappa Nu</b>	<b>2010</b>

## Publications

- B. C. K. Tee, A. Chortos, A. Berndt, A. Nguyen, A. Tom, A. McGuire, Z. Lin, K. Tien et al, "A skin-inspired organic digital mechanoreceptor," *Science*, 16 October 2015: Vol. 350 no. 6258 pp. 313-316.
- K. Tien, N. Sturcken, N. Wang et al., "An 82%-Efficient Multiphase Voltage-Regulator 3D Interposer with On-Chip Magnetic Inductors," *VLSI Technology, 2015 Symposium on*, vol., no., pp.C192-C193, 16-18 June 2015
- C. Ball, K. Tien, "Design and Development of a Visible Light Communications Link," grant report, IEEE Standard Education Committee, 2012.

## Selected Presentations/Poster Sessions

- B. Tee, A. Chortos, A. Berndt, A. Tom, A. McGuire, K. Tien, et al, "Frequency-Based Pressure Sensors for Neural Interfacing," presented in Soft Electronics Symposium at the Materials Research Society Spring 2015 Meeting
- P. Mantovani, E.G Cota, S. Kim, K. Tien, J. Chan, G. Di Guglielmo, C. Pilato, M. Kim, M. Seok, K. Shepard, L.P Carloni, "Benchmarking Methodology for Embedded Scalable Platforms," presented at SEAK Workshop, Design Automation Conference 2014.
- C. Ball, K. Tien, "Design and Development of a Visible Light Communications Link," presented at the New England Workshop for Software Defined Radio, Boston, MA, 2012.
- B. C. Tee, K. Tien, J. Jeon, Z. Bao, "Bio-inspired Artificial Touch Receptors", presented in Integration of Natural and Synthetic Biomaterials with Organic Electronics Symposium at the Materials Research Society Spring 2012 Meeting

## Memberships

Student member, IEEE; member, Order of the Engineer

## **Skills**

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### **CAD for analogue/digital/mixed signal/RF circuit design, verification:**

*Synopsys:* HSPICE, Synthesis Suite, VCS, FineSim, PrimeTime Suite, SiliconSmart ACE  
*Cadence:* Virtuoso, Spectre/SpectreRF/UltraSim, Encounter Digital Implementation/Timing System/Power System/Library Characterizer, Diva/Assura/QRC, Incisive Suite, C-to-Silicon Compiler, Allegro Suite, Voltus  
*Mentor:* Calibre nmDRC/nmLVS/xRC, ModelSim  
*Linear Technology:* LTspice  
*Agilent:* Advanced Design System  
*AVR:* Microwave Office

### **CAD for component/device design and simulation:**

*ANSYS:* HFSS, Maxwell  
*Agilent:* IC-CAP  
*Mentor:* HyperLynx 3D EM

### **Design kit use for analogue/RF/digital design in industrial technologies:**

*IBM:* CMRF7SE, CMOS9SE, CMOS10RFe, CMOS32SOI  
*TSMC:* TSMC130, TSMC018

Special experience with maintaining custom design kits, including developing rule decks (for Calibre, Assura, and Diva), technology files, and parametrised cells for layout

### **Programming:**

Perl, Tcl, Cadence SKILL, Mentor SVRF, C, C++, shell scripting, Java, MATLAB, Assembly, VHDL, Verilog, PHP, Python, System-C

Background that allows for rapid acquisition of new languages

Experience with MATLAB high-level synthesis tools for ASIC design

### **System Administration:**

Highly experienced with administration for Windows/Unix-based systems

Special experience with CAD tool environments, including tool licensing (FlexLM), design kit use/maintenance

Special experience with HPC through the Open Grid Scheduler (Sun Grid Engine)

### **Fabrication:**

Photolithography, dry etching techniques, class 100 cleanroom procedures, general wet lab techniques

### **Languages:**

English, Mandarin Chinese (native fluency), Taiwanese (conversational), Dutch (conversational)