

Tony Hyun Kim

Present Address

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Objectives

To work on state-of-the-art optical, electronic technologies and high-performance computation. To deepen my understanding of quantum physics. To make use of (and further develop) my foreign language abilities.

Citizenship: South Korean, U.S. Permanent resident (since 2006)

Education

Massachusetts Institute of Technology, Cambridge, MA

M.Eng in Electrical Engineering and Computer Science (2011).

GPA: 5.0/5.0

B.S. in Physics and Electrical Engineering; Minor in Math (2009).

GPA: 5.0/5.0

Notable lab coursework: Experimental Physics, Modern Optics Lab, Micro/Nano Fabrication, Feedback Systems, Digital Systems Laboratory, Chemical Lab Techniques, Laboratory Electronics (at Harvard)

Experience

Quantum information research, MIT RLE

Sept 2009 - Present

- Designed and fabricated an integrated-optics planar ion trap. Trap development incorporated high-precision (25 micron) conventional machining as well as semiconductor fabrication tools. Faculty supervisor: Prof. Isaac Chuang.
- Assembled a cryopumped, ultra-high vacuum experimental setup for device testing. Engineered a system to satisfy mechanical, electrical and extreme thermal constraints.
- Numerically modeled electromagnetic properties of device, and subsequently verified its predictions experimentally.
- Supervising an undergraduate project in deploying cryogenic electronics.

Teaching assistant, MIT Dept. of EECS

Sept 2009 - Present

- Instructor for the course "Signals and Systems" (6.003, Fall 2010). Faculty supervisor: Prof. Jae Lim.
- Instructor for the course "Modern Optics Lab" (6.161, Fall 2009). Faculty supervisor: Prof. Cardinal Warde.

Image Processing, Siemens Healthcare, Erlangen, Germany

June - Aug 2009

- Designed, and mathematically evaluated various image processing algorithms for correcting distorted brain MRI data.
- Prototyped an image correction algorithm in Matlab, whose results led to two patents, and which is now in deployment phase as of December 2009.

Undergraduate research, MIT Center for Ultracold Atoms

Dec 2006 - May 2009

- Designed and assembled custom electronics and other experimental apparatus, and supervised their integration into a modern atomic physics experiment.
- In addition, extensive experience in machining, software, and optical fibers. Faculty supervisor: Prof. Wolfgang Ketterle.

Teaching assistant, MIT Dept. of Chemistry Sept - Dec 2006

- Recitation instructor for the course “Thermodynamics and Kinetics” (5.60).
- Received an overall 7.0 (on 1-7 scale) on end-of-term student evaluations. Faculty supervisor: Prof. Robert Field.

Visiting researcher, Indiana University Dept. of Chemistry Summer 2004, 2006

- Performed independent computational chemistry research. Faculty supervisor: Prof. Mu-Hyun Baik. Projects include:
- Interactions between DNA and cisplatin (anticancer drug).
- Molecular orbital structure of carbon monoxide; specifically, its detailed behavior during chemical bonding.

Skills

Hardware: Expertise in analog and digital electronics including FPGA (Verilog) and microcontroller designs, conventional machining expertise (including waterjet) involving various engineering materials, fabrication experience.

Software: Matlab (including MEX), C/C++, L^AT_EX.

Foreign languages: Fluent in English, Korean. Advanced German (6 years of formal coursework).

Publications

T.H. Kim, P.F. Herskind, Taehyun Kim, Jungsang Kim, I.L. Chuang. *A surface electrode point Paul trap*. Phys. Rev. A **82**, 043412 (2010).

G.B. Jo, Y.R. Lee, J.H. Choi, C.A. Christensen, **T.H. Kim**, J. Thywissen, D.E. Pritchard, W. Ketterle. *Itinerant ferromagnetism in a Fermi gas of ultracold atoms*. *Science* **325**(5947), 1521 (2009).

Patents

T. Feiweier, **T.H. Kim**. *Verfahren zur Reduktion wirbelstrombedingter Verzerrungen in der Diffusionsbildgebung*. (Procedure for the reduction of eddy-current induced distortions in diffusion-weighted MRI.) 2009E16137DE.

T. Feiweier, **T.H. Kim**, D. Porter. *Optimierte Bestimmung von Parametern zur Korrektur wirbelstrombedingter Verzerrungen in der Mehrschicht-Diffusionsbildgebung*. (Optimized selection of relevant transformations in the correction of eddy-current distortions in multi-slice, diffusion-weighted MRI imaging.) 2009E15141DE.

Leadership positions

President, Eta Kappa Nu (MIT EECS honor society) 2009-2010

Associate advisor for EECS undergraduates, with Prof. Rajeev Ram 2009-2010

Honors and Awards

Chorafas Award [\$4,000 MEng scholarship] (2010); HKN Project Expo, 1st place (2010) [Video demonstration of my project “MIT Glove Mouse” has 90,000 views on Youtube]; Siebel Scholar [\$35,000 graduate scholarship] (2009); Orloff award for scholarship in physics (2009); Sigma Pi Sigma (Physics) and Eta Kappa Nu (EECS) memberships (2009); G.C. Newton EECS Laboratory Prize (2009); S. Klein Prize for Technical Writing (2009); Enterprise Poets Prize for Imagining a Future (2009); Lufthansa prize for German studies, 3rd place (2009); HKN Project Expo, Second prize (2009); Best papers in the courses Quantum Physics III and Digital Systems Lab (2008); CRC Freshman Achievement Award, MIT Chemistry Dept. (2006); Northwest International Baccalaureate Association Award (2005); U.S. Marines Scholastic Excellence Award (2005); Society of American Military Engineers / Seattle Post Scholarship (2005); National Merit Finalist (2004)