John Chi-Hung Chang, M.D., Ph.D.

E-mail: jcchang1a@gmail.com

EDUCATION/LICENSURE

Arizona Medical License
December, 2010 to present

ABR Certification in Diagnostic Radiology
June, 2009

California Medical License
September, 2005 to present

Illinois Medical License
June, 2004 to June, 2006

M.D., University of Illinois College of Medicine at Urbana-Champaign
Graduation: May, 2004, with Honors

Ph.D., Electrical and Computer Engineering, University of Illinois at Urbana-Champaign
Graduation: October, 2002
GPA: 3.82/4.0

B.S., Electrical and Computer Engineering, University of California, Berkeley
Graduation: August, 1995 with High Honors
GPA: 3.87/ 4.0

AWARDS

June 2009
RSNA Roentgen Resident/Fellow Research Award
Stanford, CA

November 2008
Trainee Research Prize, 2008 Annual RSNA Meeting
Chicago, IL

March 2007
Scholarship to AUR Molecular Imaging Course
Radiology Residency Program
Stanford University Medical Center

June 2005
Intern of the Year 2004-2005
Internal Medicine Residency Program
University of Illinois College of Medicine at Urbana-Champaign

May 2004
Graduation with Honors
University of Illinois College of Medicine at Urbana-Champaign

August 2000 – May 2004
NIMH NRSA MD/PhD Fellowship
NIMH support for studying patterned, sparse, living neural networks.

August 1999 – June 2000
NIH-UIUC Systems and Integrative Biology Training Grant
Training grant for developing surface modification techniques and recording of patterned neurons.

September 1998 – August 1999
Beckman Graduate Research Fellowship
Research fellowship offered by Beckman Foundation.

April 1997 and October 1997
Excellent Teaching Assistant
Ranked by students as excellent teaching assistant.

August 1995
Graduation with High Honors
Department of Electrical Engineering and Computer Science, UC Berkeley

January 1994 – May 1994
Science And Engineering Research Semester
Undergraduate research semester offered by Department of Energy through competitive application.

June 1993
Undergraduate Summer Institute in Applied Science
Undergraduate research program offered by Hertz Foundation and Lawrence-Livermore National Laboratory through competitive application.

CLINICAL EXPERIENCE

September 2011 – Present
Cancer Center Physician
Banner-MD Anderson Cancer Center, Gilbert, AZ

January 2011 – Present
Adjunct Clinical Faculty, Department of Radiology
Stanford University, Stanford, CA

January 2011 – September 2011
Staff Radiologist
Banner Imaging Associates, Phoenix, AZ

July 2010 – December 2010
Clinical Instructor
Stanford University Medical Center, Stanford, CA

July 2009 – June 2010
Body Imaging Fellowship
Stanford University Medical Center, Stanford, CA

June 2009 – June 2010
Weekend Staff Radiologist
Palo Alto Veteran's Affair Medical Center, Palo Alto, CA

July 2007 – June 2010
Injection Shift Radiologist
Stanford University Medical Center, Stanford, CA

July 2005 – June 2009
Radiology Residency
Stanford University Medical Center, Stanford, CA.

June 2004 – May 2005
Internal Medicine Internship
University of Illinois College of Medicine at Urbana-Champaign, Urbana, IL.

RESEARCH EXPERIENCE

January 2012 - Present
Adjunct Research Faculty, Arizona State University, Tempe, AZ
- Collaborate with Dr. Kaushal Rege in radiation detection using nanoparticle formation
- Collaborate with Dr. Vikram Kodobagkar on compressive sensing
- Conduct radiation sensitization with nanoparticles

January 2011 – Present
Independent Research Scientist, Banner Medical Group/Banner-MD Anderson Cancer Center
- Conduct research on nanoparticle application in cancer therapy and diagnostics
- Evaluate nonspecific quenching of quantum dot with small molecules and methods of specifying quenching
- Application of introvoxel incoherent motion components for tumor assessment

July 2005 – January 2011
Post-Doctoral Research Associate, Dr. Jianghong Rao, Stanford University
- Conduct research on quantum dot application for in vitro biochemical sensing.
- First to apply quantum dots to detect electrochemical reaction through electron transfer.
- Investigate potential applicability of quantum dots for MR detection of electrochemical reactions.

May 2002 – May 2005
Post-Doctoral Research Associate, Dr. Bruce Wheeler, University of Illinois at Urbana-Champaign
- Supervise research of graduate students.
- Analyze electrical recordings of patterned and random neuronal networks.
- Develop microstamps capable of multiple stamping.
- Improve electrode modification technique using silane-based self-assembled monolayers.

August 1995 – May 2002
Research Assistant, Dr. Bruce Wheeler, University of Illinois at Urbana-Champaign
- Developed biocompatible treatments for electrode arrays.

- Optimized multielectrode array testing procedures.
- Fabricated multielectrode array for prolonged, in vitro, hippocampal culture recording.
- First to record extracellular potential from serum-free hippocampal cultures.
- Recorded extracellular potentials from patterned and random networks.
- First to achieve extracellular recording from long-term, patterned neuronal network.
- Modified surfaces of polyimide and glass by physisorption.
- Modified surfaces of polyimide, platinum, and gold by chemisorption.
- Developed enhanced microstamping technique for extended microstamp use.
- First to develop a simple technique for extended microstamp use.
- Studied effects of patterning on neuronal network development.
- First to demonstrate neuronal patterning induces accelerated glial proliferation.

August 1994 – May 1995
Undergraduate Researcher, Dr. Edwin Lewis, University of California, Berkeley

- Maintained winear (auditory signal processing simulation).
- Digitized frog calls.
- Processed digitized calls with winear.
- Studied response of hair cells to sound wave singularities.
- Results incorporated into grant application.

January 1994 – May 1994
Student Collaborator, Dr. Mauro Citterio, Brookhaven National Laboratory through SERS Sponsored by DOE

- Developed automated data acquisition system for device noise test setup using LabView and Mathematica.
- Presented results to fellow students.
- Studied low noise circuit design.
- Wrote unpublished report titled “An Automated System For Noise Spectral Density To Equivalent Noise Charge Conversion.”

June 1993
Participant of Undergraduate Summer Institute in Applied Science, Lawrence-Livermore National Laboratory sponsored by Hertz Foundation

- Participated in seminars.
- Participated in problem solving regarding the frequency-doubling-lens test setup for NOVA laser.
- Presented results in poster-session at the conclusion of the program.

TEACHING EXPERIENCE

January 2012 - Present
Adjunct Research Faculty (Arizona State University, School for Engineering of Matter, Transport, and Energy)

- Collaborative research with Professors Kaushal Rege and Vikram Kodibagkar

July 2010 - Present
Clinical Instructor and Adjunct Clinical Faculty (Stanford University Radiology Department)

- Clinical teaching of residents and fellows

February 2004
Focused Interview Faculty Observer (UICOM Urbana-Champaign)
- Observed focused interview conducted by second year medical students.
- Provided feedback on the interview process.

June 1998 – August 1998
ECE 345 Senior Design Project Laboratory (UI Urbana-Champaign)
- Supervised senior undergraduate students (15 students) during laboratory session and office hour.
- Consulted with students regarding their project goals and design processes.
- Monitored student progress.
- Graded design reports.

April 1998
Graduate Teaching Certificate (UI Urbana-Champaign)
- Teaching certificate conferred by the Office of Instructions through intense seminars.

August 1996 – May 1998
ECE 343 Electronic Circuits Laboratory (UI Urbana-Champaign)
- Taught analog circuit lab to 32 undergraduate students.
- Supervised students during lab session.
- Answered questions regarding experiments and lab write-up.
- Graded lab reports.
- Held office hours.

August 1995 – December 1995
ECE 244 Introduction to Electric And Electronic Circuits Laboratory (UI Urbana-Champaign)
- Taught introductory lab to 40 undergraduate students.
- Supervised students during lab session.
- Answered questions regarding experiments and lab write-up.
- Graded lab reports.
- Held office hours.

June 1995 – August 1995
EECS 40 Introduction to Microelectronic Circuits (UC Berkeley)
- Graded homeworks and exams.

August 1994 – May 1995
EECS 105 Microelectronic Devices and Circuits (UC Berkeley)
- Graded homeworks and quizzes.

January 1992 - December 1992
EECS 60A The Structure and Interpretation of Computer Programs (UC Berkeley)
- Laboratory aid for students.

RESEARCH FUNDING

Banner Foundation Research Seed Funding
Support Level: 150,000
Project Title: Multiparametric MR Evaluation of Tumor Response to Therapy and Prognosis

PROFESSIONAL SERVICES

2003 – 2005
Peer Reviewer for:

- Biomaterials.
- Biomacromolecules.

COMMITTEES

2011 - 2012
Institutional Review Board, Banner-MD Anderson Cancer Center

2003-2004
Faculty Recognition Committee, UI College of Medicine

2002 – 2003
Educational Policy Committee, UI College of Medicine

1996
Allerton Conference Committee, UI College of Medicine, Medical Scholars Program

1996
Beckman Conference Committee, UI College of Medicine, Medical Scholars Program

1992 – 1993
Corresponding Secretary for Eta Kappa Nu, UC Berkeley, EECS Honor Society

1992 – 1993
Co-coordinator for Berkeley Christian Fellowship, UC Berkeley

1991 – 1993
Coordinator for True Jesus Church Youth Fellowship, San Jose, CA

PROFESSIONAL MEMBERSHIPS

1992 – Present
Eta Kappa Nu Electrical Engineering Honor Society

1992 – 1999
Institute of Electrical and Electronic Engineers Student Member

1995 – Present
Golden Key National Honor Society

2001 – 2004
American College of Physicians Student Member

2003 – 2004
Society for Neuroscience Student Member

2003 – Present
Member of Alpha Omega Alpha

2004 – 2005
American College of Physicians Associate Member

2005 – Present
American College of Radiology
Radiological Society of North America

2009 – Present
American Roentgen Ray Society

PUBLICATIONS AND PRESENTATIONS

JOURNAL ARTICLES

Chang, J.C., Stafford J., Kundra, V., Hazle, J., Brenner, M., Roberts, T., Callister, M., Schomer, D. (In Preparation) "High Incidence of Central Gland Involvement of Prostate Cancer in Intermediate to High Risk Patients Undergoing Prostate MRI"

Chang, J.C., Schomer, D.F., Stafford, J., Kodibagkar, V. (In Preparation) " Current and Potential Oncological Applications of Diffusion Imaging in the Abdomen and Pelvis"

Walker, C.R., Pushpavanam, K., Nair, D.G., Potta, T., Sutiyoso, C., Kodibagkar, V., Sapareto, S., **Chang, J.**, Rege, K. (Accepted) "Generation of Polypeptide Templated-Gold Nanoparticles Using Ionizing Radiation," Langmuir.

Chang, J.C., Rubin, G.D. (2009) "Solitary Intercostal Arterial Trunk: A Previously Unreported Anatomical Variant," Circulation: Cardiovascular Imaging, vol. 2, pp e49-e50.

Chang, J.C., Brewer, G.J., and Wheeler, B.C. (2006) "Neuronal Network Structuring Induces Greater Neuronal Activity Through Enhanced Astroglial Development," J. Neural Eng., vol. 3, pp 217-226.

Nam, Y., **Chang, J.C.**, Khatami, D., Brewer, G.J., Wheeler, B.C. (2004) "Patterning to enhance activity of cultured neuronal networks," IEE Proc.-Nanobiotechnol., vol. 151, issue 3, pp 109-115.

Nam, Y., **Chang, J.C.**, Wheeler, B.C., and Brewer, G.J. (2004) "Gold Coated Microelectrode Array with Thiol Linked Self-Assembled Monolayers for Engineering Neuronal Cultures," IEEE Trans. Biomed. Eng., vol. 51, issue 1, pp 158-165.

Chang, J.C., Brewer, G.J., and Wheeler, B.C. (2003) "A Modified Microstamping Technique Enhances Polylysine Transfer And Neuronal Cell Patterning," Biomaterials, vol. 24, issue 17, pp 2863-2870.

Chang, J.C., Brewer, G.J., and Wheeler, B.C. (2001) "Modulation of Neural Network Activity by Patterning," Biosensors and Bioelectronics, vol. 16, issue 7-8, pp 527-533.

Chang, J.C., Brewer, G.J., and Wheeler, B.C. (2000) "Microelectrode Array Recordings of Patterned Hippocampal Neurons for Four Weeks," J. Biomed. Microdevices., vol. 2, issue 4, pp 245-253.

BOOK CHAPTERS

Chang, J.C., Gambhir, S.S., Willmann, J.K. (2011) “Imaging Techniques in Drug Development and Clinical Practice,” in Cancer Drug Delivery, Ed. F. Kratz, P. Senter, and H. Steinhagen. Wiley-VCH, Weinheim, Germany.

Chang, J.C., and Wheeler, B.C. (2006) "Patterning Technologies for Structuring Neuronal Networks on Multielectrode Arrays," in Advances in Network Electrophysiology Using Multi-Electrode Arrays, Ed. M. Taketani and M. Baudry, Springer, NY.

THESES

Chang, J.C. (2002) "Technologies for And Electrophysiological Studies of Structured, Living, Neuronal Networks on Microelectrode Arrays," Doctoral dissertation, Department of Electrical and Computer Engineering, University of Illinois, Urbana.

Chang, J.C. (1997) "A Novel, Thin Silicon Oxide Coating for Multielectrode Array Surface Modification," Master thesis, Department of Electrical and Computer Engineering, University of Illinois, Urbana.

CONFERENCE ABSTRACTS AND PRESENTATIONS

Chang, J., Stafford, J., Hazle, J., Schomer, D. (2014) "Intravoxel Incoherent Motion (IVIM): Applications in Abdominal and Pelvic Oncologic Imaging," UT MD Anderson Cancer Center Global Academic Program, Seoul, South Korea.

Pushpavanam, K.S., Walker, C.R., Nair, D.G., Potta, T., Sutiyoso, C., Kodibagkar, V., Sapareto, S., **Chang, J.**, Heys, J., Rege, K. (2013) "Colorimetric detection of ionizing radiation," Annual Meeting of AIChe, San Francisco, CA.

Chang, J.C., Mirza, R., Stafford, J., Hazle, J., Schomer, D.F. (2013) "MRI may Improve Biopsy Accuracy in Patients with Intermediate Risk Prostate Tumors," UT MD Anderson Cancer Center Global Academic Programs, Houston, TX.

Chang, J.C., Mirza, R., Ma, J., Hazle, J., Schomer, D.F. (2013) "Diffusion MRI for Oncological Evaluation in the Abdomen and Pelvis - A Short Review and Application at BMDACC," UT MD Anderson Cancer Center Global Academic Programs, Houston, TX.

Chang, J.C., Schomer, D.F. (2012) "Metabolic Imaging with Quantum Dots," UT MD Anderson Cancer Center Global Academic Programs, Oslo, Norway.

Chang, J.C., Rao, J. (2008) "Functional Detection of Glucose Oxidase Activity by Electron Transfer to Quantum Dots," 94th Scientific Assembly and Annual Meeting of RSNA, Chicago, IL.

Khatami, D.B., **Chang, J.C.,** Brewer, G.J., Wheeler, B.C. (2004) "Effects of Spatial Confinement on the Activity of Linearly Patterned Biological Neural Networks," Society for Neuroscience 34th Annual Meeting, San Diego, CA.

Scharnweber, R., Nam, Y., **Chang, J.C.,** Brewer, G.J., Wheeler, B.C. (2003) "Technique for Presenting Multiple Guidance Cues to Cultured Embryonic Rat Hippocampal Neurons," Society for Neuroscience 33rd Annual Meeting, New Orleans, LA.

Chang, J.C., Brewer, G.J., Wheeler, B.C. (2003) "A Patterned Substrate Modulates Glial Development And Synaptic Density in A Serum-Free Hippocampal Culture," Society for Neuroscience 33rd Annual Meeting, New Orleans, LA.

Wheeler, B.C., Brewer, G.J., Nam, Y., **Chang, J.C.** (2003) "Taking Neurons to Electrodes," Asilomar Conference on Cochlear Implants, Asilomar, CA.

Scharnweber, R., Nam, Y., **Chang, J.C.,** Brewer, G.J., Wheeler, B.C. (2003) "Technique for Presenting Multiple Guidance Cues to Cultured Embryonic Rat Hippocampal Neurons," 23rd Annual Medical Scholars Program Fall Retreat, Lake of the Woods Park, Mahomet, IL.

Nam, Y., **Chang, J.C.**, Scharnweber, R., Wheeler, B.C., and Brewer, G.J. (2003) "A New MEA Design Approach for Patterned Neuronal Circuit," 3rd International Conference on Substrate-Integrated Multielectrodes, Denton, TX.

Chang, J.C., Brewer, G.J., Wheeler, B.C. (2002) "An Enhanced Microstamping Technique for Controlled Deposition of Proteins," 2nd Annual International IEEE-EMBS Special Topic Conference on Microtechnologies in Medicine and Biology. Proceedings. IEEE. 2002, pp.126-31. Piscataway, NJ, USA.

Wheeler, B.C., Brewer, G.J., **Chang, J.C.,** Nam, Y. (2001) "Designing In Vitro Patterned Neuronal Networks," 2001 Material Research Society Fall Meeting, Boston, MA.

Chang, J.C., Brewer, G.J., Wheeler, B.C. (2001) "Spatial Patterning Of Neuronal Cultures Increases Apparent Network Activity," Society for Neuroscience 31st Annual Meeting, San Diego, CA.

Branch, D.W., **Chang, J.C.,** Brewer, G.J., Wheeler, B.C. (1999) “Rational Design of In Vitro Neural Networks Using Patterned Self-Assembled Monolayers,” American Chemical Society, Los Angeles, CA.

Chang, J.C., Wheeler, B.C., and Brewer, G.J. (1999) “Substrate Recording of Patterned Hippocampal Neurons on Multielectrode Array,” IEEE EMBS 21st Annual Interational Conference, Atlanta, GA.

Chang, J.C., Brewer, G.J., Wheeler, B.C. (1999) “Substrate Recording of Patterned Neural Networks,” Medical Scholars Program Semiannual Conference, Beckman Insitute, Urbana, IL.

Branch, D.W., **Chang, J.C.**, Brewer, G.J., Wheeler, B.C. (1998) “Micropatterned Neural Networks,” 29th NIH Neural Prosthesis Conference, Bethesda, MD.

Wheeler, B.C., Branch, D., **Chang, J.,** Venkateswar, K. (1998) “Microstamping Proteins for Precise Control of Nerve Cell Growth in Culture,” Beckman Institute Symposium on the Frontiers of Mesoscale Systems and Microfabrication, Urbana, IL.

Chang, J.C., Brewer, G.J., Wheeler, B.C. (1997) “Multielectrode Arrays for Recording from Patterned Hippocampal Neurons in Culture,” Medical Scholars Program Semiannual Conference, Allerton Park, Monticello, IL.

Wheeler, B.C., **Chang, J.C.,** Berke, B.A., Corey, J.M., and Branch, D.W. (1996) “Technology for Neuronal Pattern Synthesis and Recording,” Annual Fall Meeting of the Biomedical Engineering Society, University Park, PA.

Chang, J.C., Brewer, G.J., Wheeler, B.C. (1996) “Surface Modified Electrode Arrays for Recording Patterned Neuronal Networks,” Medical Scholars Program Semiannual Conference, Allerton Park, Monticello, IL.

PRESENTATIONS

Chang, J. (2013) "MR Imaging in Oncology: Examples," Graduate MRI Course Invited Lecture, Arizona State University, Tempe, AZ.

Chang, J. (2012) "Liver Transplant Complications," Arizona Sonographers Society Annual Meeting, Banner Gateway Medical Center, Gilbert, AZ.

Chang, J. (2012) "MR Diffusion in Oncology," 1st Annual Innovative Cancer Therapies Conference, Banner-MD Anderson Cancer Center, Scottsdale, AZ.

Chang, J. (2012) "Matrix without Neo," Resident Noon Conference, Department of Radiology, Stanford University, Stanford, CA.

Chang, J. (2012) "Prostate MRI," Resident Noon Conference, Department of Radiology, Stanford University, Stanford, CA.

Chang, J. (2012) "Functional MRI in Oncology," Resident Noon Conference, Department of Radiology, University of Arizona, Tucson, AZ.

Chang, J. (2011) “MR Contrast Agents,” In-Service, Department of Radiology, Banner Gateway Medical Center, Gilbert, AZ.

Chang, J. (2011) “MRI in Oncology,” Resident Noon Conference, Department of Radiology, UT Southwestern Medical Center, Dallas, TX.

Chang, J. (2009) “Nanoparticles in Medicine,” Resident Noon Conference, Department of Radiology, UT Houston Medical Center, Houston, TX.

Chang, J. (2008) "RCC and Mimics," Resident Noon Conference, Department of Radiology, Stanford University, Stanford, CA.

Chang, J. (2005) "Thoracic Imaging: CXR and CT Scans of Pulmonary Parenchyma and Mediastinum," Noon Conference, Department of Internal Medicine, University of Illinois College of Medicine, Urbana, IL.

Made Gowda, N., **Chang, J.**, Gowda, P., Ho, D. (2004) "Propylthiouracil - The Culprit," Department of Internal Medicine, Clinical Vignette Competition, University of Illinois College of Medicine, Urbana, IL.

Chang, J.C. (2003) "Role of COX2 in Cancer Treatment," Medical Student Presentation, Department of Radiation Oncology, Stanford University School of Medicine, Stanford, CA.

Chang, J.C., Brewer, G.J., Wheeler, B.C. (2002) "Structured Neuronal Networks - An Alternative Paradigm for Studying Brain Function," Medical Scholars Program Semiannual Conference, Allerton Park, Monticello, IL.

Chang, J.C. (2001) "Synthesis of Electrically Active Neural Network," Nanohour, University of Illinois at Urbana-Champaign, Urbana, IL.

LANGUAGES

Mandarin – Fluent in speaking and reading. Fair in writing.

English – Fluent in writing, speaking, and reading.

INTERESTS

Sports – Basketball, volleyball, softball, swimming, hiking, tennis.

Finance – Stocks, bonds, mutual funds, and small business.

REFERENCES

Provided on request.