CURRICULUM VITAE

Subhashini Chandrasekharan, PhD
IGSP Center for Genome Ethics Law and Policy
Phone: 919-684-0417, Email: shubha.c@duke.edu

EDUCATION

PhD Genetics and Molecular Biology, 2001, University of North Carolina at Chapel Hill, NC, USA
Curriculum in Genetics & Molecular Biology, University of North Carolina, Chapel Hill

MSc. (Honors) Biology 1993, Birla Institute of Technology & Science, Pilani, India

RESEARCH EXPERIENCE

Senior Research Associate, Center for Genome Ethics Law and Policy, IGSP, Duke University 11/1/2008 – present

Post-doctoral Research Associate, Center for Public Genomics (CPG), IGSP, Duke University 10/1/2006 – 10/2008
Research projects included:

1. Review and analysis of the evidence for impact of patents and licensing practices on patient and clinical access to genetic testing for cystic fibrosis, hearing loss, hereditary hemochromatosis and spinocerebellar ataxia. This is part of research commissioned by the Secretary's Advisory Committee on Genetics Health and Society Task Force on the impact of patents on genetic testing in the US.
2. Analysis of the impact of intellectual property and university technology transfer on promoting regional manufacturing and enabling access to first and second generation HPV vaccines in the developing world.
3. The impact of open science and proprietary information on research- A case study of the engineered Zinc Finger Protein biology field. This project was performed in collaboration with Sapna Kumar JD and Prof. Arti Rai at the Duke Law School.

Mentor: Robert Cook-Deegan M.D.

Post-doctoral Research Associate, Dept of Genetics, UNC-Chapel Hill 7/2001 – 9/2006
Defining the biological function of PGE_2 in normal mammary gland physiology and tumorigenesis using transgenic and gene knockout mice for PGE_2 metabolism enzymes and receptors
Mentor: Beverly H. Koller PhD

Doctoral Student, Curriculum in Genetics and Molecular Biology, UNC- Chapel Hill 12/1995- 5/2001
Dissertation: Targeted Disruption of the Non-Receptor-Tyrosine Kinase, *Frk*.
Generated and characterized mice deficient in the src-like epithelial tyrosine kinase Frk/rak
Mentor: Edison T. Liu M.D.

Research Assistant, Department of Microbiology, SUNY Buffalo, NY 7/1993 – 7/1994
MSc. (Honors) Thesis Training Program BITS Pilani 1/93- 6/93
Functional *in vitro* characterization of the VZV ORF 63 gene product
Advisor: John Hay PhD

GRANTS & FELLOWSHIPS

1 R03 HG005026-01 4/1/2009 – 3/31/2011
NHGRI, NIH
Title: Intellectual Property Challenges for the Development of Genomic Diagnostics

Role: Principal Investigator (PI)
Co-investigators: Robert Cook-Deegan, Arti K Rai

Josiah Charles Trent Memorial Foundation, 5/15/08- 5/14/09
Title: Access to Cervical Cancer Vaccines - An Analysis of Technical Legal, Regulatory and Societal Challenges in India.
Role: Project Director
Principal Investigator: Robert Cook-Deegan

Department of Defense Breast Cancer Postdoctoral Training Grant, 5/ 03- 10/06

Hoechst Callnesse Fellowship, 8/94 – 8/95 Awarded by Hoechst Callnesse Inc. for Merit, Curriculum in Genetics and Molecular Biology, UNC-Chapel Hill

ACADEMIC HONORS
National Talent Search Scholar, 1987 - 93 Awarded by the Government of India for Academic Excellence

PUBLICATIONS
Selected peer-reviewed publications

Chandrasekharan S, Kumar S, Valley CM, Rai A. Proprietary science, open science and the role of patent disclosure: the case of zinc-finger proteins. 2009. ***Nature Biotechnology*** 27(2):140–44.

Cook-Deegan R, **Chandrasekharan S,** Angrist M. The dangers of diagnostic monopolies. 2009. ***Nature*** 58(7237):405-406.

Jania LA, **Chandrasekharan** S, Backlund MG, Foley NA, Snouwaert J, Wang IM, Clark P, Audoly LP, Koller BH. Microsomal prostaglandin E synthase-2 is not essential for in vivo prostaglandin E2 biosynthesis. 2009 ***Prostaglandins Other Lipid Mediat***. 88(3-4):73-81.

Subhashini Chandrasekharan, Michael G Backlund, Patsy Clark, Daigen Xu, Leigh Jania, Leslie Lang, Laurent P. Audoly and Beverly H. Koller. PGE_2 Independent formation of chemically induced and COX-2 dependent mammary tumors in mPGES-1 deficient mice. *In preparation*

Jason I Herschkowitz, Karl Simin, Victor J. Weigman, Igor Mikaelian, Zhiyuan Hu, Karen E. Rasmussen, Laundette P. Jones, Shahin Assefina, **Subhashini Chandrasekharan**, Michael G. Backlund, Yuzhi Yin et al. Identification of conserved gene expression features across human and murine mammary tumors. 2007. ***Genome Biology***. 8(5):R76.

Subhashini Chandrasekharan, Nicholas A. Foley, Leigh Jania, Laurent P. Audoly and Beverly H. Koller Coupling of COX-1 to mPGES1 for prostaglandin E_2 biosynthesis in the murine mammary gland. 2005. ***J Lipid Res***.46: 2636-48.

Michael Welsh, Charlotte Welsh, Maria Ekman, Johan Dixelius, Robert Hägerkvist, Cecilia Annerén, Björn Åkerblom, Siavosh Mahboobi, **Subhashini Chandrasekharan**, and Edison T. Liu. The FRK/RAK tyrosine kinase participates in cytokine-induced islet cell toxicity. 2004. ***Biochem J***. 382(Pt 1): 261-8.

Subhashini Chandrasekharan, Tinghu Qiu, Nawal Alkharouf, Kelly Brantley, James B. Mitchell and Edison T. Liu Characterization of Mice deficient in the Src family Non-Receptor Tyrosine Kinase *Frk/rak* 2002. ***Mol Cell Biol***. 22(14): 5235-47.

Jang-Ming Li, Michael A. Nichols, **Subhashini Chandrasekharan**, Yue Xiong and Xia Fan Wang Transforming Growth Factor β Activates the Promoter of Cyclin-Dependent Kinase Inhibitor $p15^{INK4B}$ Through an SP-1 Consensus Site.1995. ***J Biol. Chem***. 270(45): 26750-3.

Select Invited Book Chapters, Review Articles and Reports

Chandrasekharan S, Cook-Deegan R. Gene patents and personalized medicine - what lies ahead? 2009. ***Genome Medicine*** 1(9):92.

Chandrasekharan S., Perin N.C., Wiechers I.R., and Cook-Deegan, R. Public–Private Interactions in Genomic Medicine: Research and Development In: *Genomic and Personalized Medicine, editors Willard HF, Ginsburg GS, (NY: Elsevier, 2008), pp. 434-444*
Description available from: http://www.elsevier.com/wps/find/bookdescription.cws_home/716375/description#description

Commissioned Case Studies for the Secretary's Advisory Committee of Genetics Health and Society.

Chandrasekharan S, Fiffer M. Impact of gene patents and licensing practices on access to genetic testing for hearing loss. Peer-reviewed case study commissioned by the Secretary's Advisory Committee on Genetics, Health, and Society (SACGHS); Released for public comment 2009 March 3. Available from: http://oba.od.nih.gov/SACGHS/sacghs_documents.html

Chandrasekharan S, Heaney C, James T, Conover C, Cook-Deegan R. Impact of gene patents and licensing practices on access to genetic testing for cystic fibrosis. Peer-reviewed case study commissioned by the Secretary's Advisory Committee on Genetics, Health, and Society (SACGHS); Released for public comment 2009 March 3. Available from: http://oba.od.nih.gov/SACGHS/sacghs_documents.html

Chandrasekharan S, Pitlick E, Heaney C, Cook-Deegan R. Impact of gene patents and licensing practices on access to genetic testing for hereditary hemochromatosis. Peer-reviewed case study commissioned by the Secretary's Advisory Committee on Genetics, Health, and Society (SACGHS); Released for public comment 2009 March 3. Available from: http://oba.od.nih.gov/SACGHS/sacghs_documents.html

Angrist M, **Chandrasekharan S**, Heaney C, Cook-Deegan R. Impact of gene patents and licensing practices on access to genetic testing for Long QT syndrome. Peer-reviewed case study commissioned by the Secretary's Advisory Committee on Genetics, Health, and Society (SACGHS); Released for public comment 2009 March 3. Available from: http://oba.od.nih.gov/SACGHS/sacghs_documents.html

Selected Presentations

Subhashini Chandrasekharan, Eric Jiang and Alex Cho. **Intellectual Property and Genomic Diagnostics for Type II Diabetes.**
***Personal Genomes* Cold Spring Harbor Meeting,** Cold Spring Harbor New York, October 2008

Subhashini Chandrasekharan and Robert Cook-Deegan Intellectual Property Challenges for Development of Multi-gene Diagnostic Tests
Platform presentation, **American Society of Human Genetics Annual Meeting**, November 14, 2008

Subhashini Chandrasekharan Patents and Licensing and Access to Genetic Testing in the US
Invited presentation and panel discussant
Translating Ethical, Legal and Social Implications of Genomic Research
International conference, Cleveland, Ohio, May 1-3, 2008

Carla Rydholm**, Subhashini Chandrasekharan** and Robert Cook-Deegan The impact of University Licensing Practices and DNA-based patents on Genetic Testing access, Poster presentation
***Changing Horizons,* Association of University Technology Managers, Annual Meeting**, San Diego, California, USA, February 28- March 1 2008

Subhashini Chandrasekharan, Nicholas A. Foley, Leigh Jania, Laurent P. Audoly and Beverly H. Koller The Role of Prostaglandin E_2 in the Normal development and Mammary Epithelial Transformation, Poster presentation
DOD Era of Hope Breast Cancer Research Program Meeting, Philadelphia, PA, USA, June 2005

Subhashini Chandrasekharan, Nicholas A. Foley, Beverly H. Koller. The Role of Prostaglandin E_2 in the Normal development and malignant Transformation of Mammary Epithelium, Poster presentation
Advances in Breast Cancer Research, Genetics, Biology and Clinical Implications, AACR Special Conference, Huntington Beach, CA, USA, October 2003

PROFESSIONAL TRAINING

- **Bioethics Training, Intensive Bioethics Course 33**: *Decision making in the 21st century*, June 4-9 2007, Kennedy Institute of Bioethics, Georgetown University

- **Workshop on Genetics, Evolution and Cognitive ability** June 11-12, 2007, organized by the Center for Integration of Research on Genetics and Ethics, Stanford Center for Biomedical Ethics.

- **NHGRI Training Workshop on ELSI Grant Writing** October 17, 2007. NIH, Bethesda.

- **Leadership Training Certification, Center for Creative Leadership**
  UNC Leadership Symposium, June 2006, UNC-Chapel Hill

- **Grant Writing Symposium for Biological & Physical Sciences**, June 2005, UNC- Chapel Hill
  Participated in an NIH R01 grant proposal peer-review mock study section exercise

- **Management Strategies: Building a Foundation for Success,** June, 2003 UNC-Chapel Hill

TEACHING

- Instructor, ***Cancer Biology BIO445*** University of North Carolina Chapel Hill, May12- June 15 2009,

- Teaching assistant, ***PUBPOL240*** *Responsible Genomics*, Duke University 1/2007- 5 /2007

- **BIO98**, Undergraduate Research Project, Mentor, UNC-Chapel Hill 8/2003 –12/2003 & 12/2004- 5/2004

- **Guest Lectures**
  Duke University, PUBPOL 240, Responsible Genomics, May 2007
  Topic: **Genomics and Global Health**

  Duke University, LEAP Summer Program, July 2007
  Topic: **Breast Cancer Therapy**

  UNC-Chapel Hill, GEN 113, Core course, Curriculum of Genetics and Molecular Biology- 4/2004, 4/2005
  North Carolina Central University 4/2005, 4/2006
  Topic: **Mouse Models for Cancer**

SERVICE

- **Coordinator, IGSP, Science and Society Journal Club,** Duke University, November 2007- present. Initiated and currently help co –ordinate this monthly journal club at IGSP

- **Instructor, Responsible Conduct of Research Course,** Trent Center for Bioethics, Duke University September 2009

- **Guest lecturer, Responsible Conduct of Research training, IGSP Dept of Computational Biology and Bioinformatics**, September 18, 2009 & September 20 2008.

- **Invited Panelist "Altruistic Careers"** Women in Science and Engineering , Duke University, March 21, 2008