

# Tongjun Gu, Ph.D.

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## Profile

I am interested in developing computational algorithms and statistical models for understanding the complex biological systems and human diseases. My training and experience encompass bioinformatics, biostatistics, genetics, genomics, cancer biology, RNA sciences, metabolic phenotypes, molecular biology experiments and mouse surgery. And I am specialized in developing algorithms to integrate different types of data into the analysis to better understand the underlying mechanisms.

## Education

- 09/2004 – 06/2009      Ph.D. candidate and obtained the official Ph.D. degree on 27/03/2010  
   Institute of Biophysics, Chinese Academy of Sciences, China
- 09/2000 – 06/2004      B.S.      Huazhong University of Science and Technology, China

## Research experience

01/2016 – present      **The University of Florida**, Gainesville, FL, USA

Assistant Scientist, Bioinformatics and Biostatistics

Work Focus:

- 1) Consult and perform on experimental design, data analysis and grant application. Research fields including gene expression, RNA editing and DNA variants analysis; genetics network analysis; microRNA and its target analysis; drug effects analysis; metagenomics data analysis...

09/2013 – 09/2014      **The University of Chicago**, Chicago, IL, USA

Postdoctoral Scholar, Bioinformatics and Biostatistics, cancer study

10/2014 – 01/2016      **The University of Chicago**, Chicago, IL, USA

Research Professional, Bioinformatics and Biostatistics, cancer study

Supervisor: Dr. Kevin White

*Research Focus:*

- 1) Analyzed thousands of cancer sequencing and clinical data from US national (TCGA) and international (ICGC) cancer projects.
  - a. Developed mix effect models to identify differential editing sites between tumor and normal samples and statistical models for survival analysis.
  - b. Developed two steps of generalized linear regression models to identify possible candidate genes that control RNA editing process and built the pathway to explain the mechanism of cancer development.
  - c. Developed a sparse regression model to study the association between gene, RNA editing and miRNAs.
- 2) Led the analysis of a large pancreatic cancer project with collaboration of clinical groups, sequencing core and experimental groups.
  - a. Built pipelines for discovering somatic point mutations, copy number alterations and RNA editing sites, and for quantifying gene, isoform and small RNA expression from fresh tumors, FFPE and PDX.
  - b. Studied tumor progression and drug effects by analyzing PDX (Patient-derived tumor xenografts) samples with primary tumor samples.

01/2010 - 09/2013      **The Jackson Laboratory**, Bar Harbor, ME, USA  
Postdoctoral Associate, Bioinformatics and Biostatistics, quantitative genetics study  
Advisors: Drs. Robert Braun, Gary Churchill and Matthew Hibbs

*Research focus:*

- 1) Developed a quantitative genetic analysis model to identify the polymorphisms that control RNA editing process and demonstrated that A-to-I and C-to-U editing have distinct regulation pathways in mouse.
- 2) Identified the problems in the analysis of deep sequencing data for mutation discovery and developed pipelines that integrate multiple algorithms to discover confident RNA editing sites/SNPs.

09/2004 - 07/2009      **Institute of Biophysics, Chinese Academy of Sciences**, Beijing, China  
04/2005 – 07/2008      **Institute of Computing Technology, Chinese Academy of Sciences**, Beijing, China

Ph.D. candidate, Bioinformatics, small RNA and mRNA study

Advisors: Profs. James Q. Yin, Yi Zhao and Zhen'ge Qiu

*Research focus:*

- 1) Developed multiple algorithms/pipelines to discover and characterize novel small RNAs from RNA-seq and genomic data: improved dynamic programming algorithm, secondary structure prediction, motif discovery, conservation and evolution analysis etc.
- 2) Explored the function, evolution and transcription of different kinds of small RNAs and first reported that miRNAs can be transcribed along with other elements by read-through mechanism.
- 3) Discovered an endogenous small RNA that can convert *Fli1*<sup>+</sup> stem cells into hematopoietic stem cells, supplying an alternate source of hematopoietic stem cells for transplantation.

## Fellowships

01/2012 - 09/2013      The Jackson Laboratory postdoctoral fellowship  
06/2012                  Travel fellowship for RNA sciences meeting, including register, traveling, hotel and food, RIKEN CDB, Japan  
2004 - 2009              Research Scholarship, Chinese Academy of Sciences, China

## Awards

2007 - 2008              Outstanding student of Chinese Academy of Sciences  
2000 - 2003              Outstanding student of School of Life Science and Technology, Huazhong University of Science and Technology

## Selected Publications/Manuscripts

T Gu, AQ Fu, MJ Bolt, X Zhao. (2020) Systematic identification of A-to-I editing associated regulators from multiple human cancers. *Computers in Biology and Medicine*, 103690.

T Gu, X Zhao, WB Barbazuk, JH Lee. (2020) miTAR: a hybrid deep learning-based approach for predicting miRNA targets. *bioRxiv*.

T Gu, X Zhao. (2019) Integrating multi-platform genomic datasets for kidney renal clear cell carcinoma subtyping using stacked denoising autoencoders. *Scientific reports* 9 (1), 1-11.

T Gu, AQ Fu, MJ Bolt, KP White. (2019) Clinical Relevance of Noncoding Adenosine-to-Inosine RNA Editing in Multiple Human Cancers. *JCO clinical cancer informatics* 3, 1-8.

L Reznikov, Y Liao, K Davis, T Gu, S Kuan, K Atanasova, J Dadural, E Collins, M Guevara, K Vogt. (2018) AIRWAY-NERVOUS SYSTEM MEDIATORS FOR AIRWAY PROTECTION. *PEDIATRIC PULMONOLOGY* 53, 200-200.

Leah R Reznikov, Yan-Shin J Liao, Tongjun Gu, Katelyn M Davis, Shin-Ping Kuan, Kalina R Atanasova, Joshua S Dadural, Emily N Collins, Maria V Guevara, Kevin Vogt. (2018) Sex-specific airway hyperreactivity and sex-specific transcriptome remodeling in neonatal piglets challenged with intra-airway acid. *Am J Physiol Lung Cell Mol Physiol* 316: L131–L143.

P. Sheng, C. Fields, K. Aadland, T. Wei, O. Kolaczkowski, T. Gu, B. Kolaczkowski and M. Xie. (2018) Dicer cleaves 5'-extended microRNA precursors originating from RNA Polymerase II transcription start sites. *Nucleic acids research* 46 (11), 5737-5752.

Sang-Joon Ahn, Tongjun Gu, Jin Koh, and Kelly C. Rice. (2017) Remodeling of the *Streptococcus mutans* proteome in response to LrgAB and external stresses. *Scientific Reports* 7, Article number: 14063.

Han C, Kim MJ, Ding D, Park HJ, White K, Walker L, Gu T, Tanokura M, Yamasoba T, Linser P, Salvi R, Someya S. (2017) GSR is not essential for the maintenance of antioxidant defenses in mouse cochlea: Possible role of the thioredoxin system as a functional backup for GSR. *PLoS One* 12(7):e0180817.

Yanfei Qi, Ruby Goel, Avinash Singh Mandloi, Ravneet Vohra, Glenn Walter, Yarrow F Joshua, Tongjun Gu, Michael J Katovich, Juan M Aranda, Malcolm Maden, Mohan K Raizada, Carl J Pepine. (2017) Spiny mouse is protected from ischemia induced cardiac injury: leading role of microRNAs. *The FASEB Journal* vol. 31 no. 1 Supplement 721.4.

Kelly C. Rice, Matthew E. Turner, O'neshia V. Carney, Tongjun Gu, Sang-Joon Ahn. (2017) Modification of the *Streptococcus mutans* transcriptome by LrgAB and environmental stressor. *MicroBial Genomics* 2017 3.

Isabel Romcro Calvo, Ashwin Akki, Andrey Ugolkov, Mary M. Buschmann, Samantha M. Sparrow, Teresa Barry, Margaret Eber, Tongjun Gu, Shuang Qin Zhang, Hedy Kindler, William Dale, Kevin Roggin, Andrew P. Mazar, Kevin P. White, Christopher R. Weber. (2016) Organoids and patient-derived tumor xenograft of pancreatic adenocarcinoma share morphological and genetic feature with the primary tumor. *AACR 2016: Abstracts 2697-5293: #4272*.

Gu, T, Gatti DM, Srivastava A, Snyder EM, Raghupathy N, Simecek P, Svenson KL, Dotu I, Chuang JH, Keller MP, Attie AD, Braun RE, Churchill GA. (2016) Genetic Architectures of Quantitative Variation in RNA Editing Pathways. *Genetics* 202, 787-798.

Gu T, Buaas FW, Simons AK, Ackert-Bicknell CL, Braun RE, *et al.* (2012) Canonical A-to-I and C-to-U RNA Editing Is Enriched at 3'UTRs and microRNA Target Sites in Multiple Mouse Tissues. *PLoS ONE* 7(3).

Aljakna A, Choi S, Savage H, Hageman Blair R, Gu T, *et al.* (2012) Pla2g12b and Hpn Are Genes Identified by Mouse ENU Mutagenesis That Affect HDL Cholesterol. *PLoS ONE* 7(8).

Greenlee AR, Shiao M-S, Snyder E, Buaas FW, Gu T, *et al.* (2012) Deregulated Sex Chromosome Gene Expression with Male Germ Cell-Specific Loss of Dicer1. *PLoS ONE* 7(10).

Tong J Gu, Xiang Yi, Xiwu Zhao, Yi Zhao, James Q. Yin. (2009) Alu-directed transcriptional regulation of some novel miRNAs. *BMC Genomics*, 10: 563.

Tongjun Gu, James Q. Yin, Yanwei Xu, Zhenghua Dai, Zhenge Qiu, Shenzhong Feng, Xiang Yi, Ling Jiang & Hongjie Zhang. (2008) A novel class of endogenous shRNAs in human cells. *Nature Precedings*.

Dong Xu, Hua Li, Tongjun Gu. (2008) Shape Representation and Invariant Description of Protein Tertiary Structure in Applications to Shape Retrieval and Classification, Geometric Modeling and Processing. *Lecture Notes in Computer Science*, vol. 4975, pp. 556-562.

Dong Xu, Hua Li, Tongjun Gu. (2007) Protein Structure Superposition by Curve Moment Invariants and Iterative Closest Point, *1<sup>st</sup> International Conference on Bioinformatics and Biomedical Engineering (ICBBE'07)*, vol.1, pp. 25-28.

Dong Xu, Hua Li, Tongjun Gu. (2007) Common Substructure Extraction of Proteins by Geometric Invariants, *10<sup>th</sup> International Conference on Computer-Aided Design and Computer Graphics (CAD/Graphics'07)*, pp. 86-91.

### **Invited oral presentations**

- 11/2018 2018 CSHL meeting on Biological Data Science. The abstract was selected to give a lighting talk in addition to presenting a poster.
- 10/2017 American Society Human Genetics meeting 2017 (~7500 people attended the meeting). The abstract was selected as Reviewers' Choice Abstracts (top 10%) and also selected to give a Poster Talk (only 23 were selected to give the Poster talk)
- 07/2016 ISMB 2016, Invited oral presentation at Highlight Track and poster presentation at TransMed Special Interest Group Meetings
- 01/2013 2013 Gordon Research Conferences on RNA editing, poster presentation; my mentor, Dr. Robert Braun, was invited to give a talk about my RNA editing work
- 06/2012 RNA Sciences in Cell and Developmental Biology II, The 22<sup>nd</sup> CDB Meeting, RIKEN CDB, Japan, invited to give a talk and poster presentation
- 05/2012 2<sup>nd</sup> generation sequencing, GTC, invited to give a talk
- 11/2011 2011 Cold Spring Harbor Laboratory meeting on Genome Informatics, invited to give a talk
- 04/2011 Maine Biological and Medical Sciences Symposium, invited to give a talk

### **Poster presentations**

- 05/2020 2020 CSHL meeting on The Biology of Genomes, poster presentation (online)
- 10/2019 ASHG, poster presentation
- 05/2014 TCGA Third Annual Scientific Symposium, NIH, poster presentation
- 05/2013 2013 CSHL meeting on The Biology of Genomes, poster presentation
- 09/2011 JAX-MDIBL Joint Scientific Symposium, poster presentation
- 08/2011 Mammalian Gametogenesis & Embryogenesis, Gordon Research Conference, poster presentation
- 06/2011 Talk at Genetics Interesting Group (the classical interesting group), The Jackson Laboratory

### **Service**

- 2018-present Review Editor in Bioinformatics and Computational Biology, part of the journal(s) *Frontiers in Genetics*, *Plant Science* and *Bioengineering and Biotechnology*.
- 2018-present Reviewer for *JCO Clinical Cancer Informatics*, *Cellular and Molecular Life Sciences*, *World Journal of Surgical Oncology*, *Scientific Reports*, *Frontiers*, *Plos One*, *IEEE*.
- 2017-2018 Member of the American Society of Human Genetics
- 2010-2011/2016-2018 Member of the International Society for Computational Biology

## **Pedagogy**

- 05/2013 Introduction to Biology, Teaching practice with mock university students from The Jackson Laboratory; received positive feedback from Drs. Tara Affolter, Michelle Smith and Jeremy Ward.
- 03/2013 Introduction to RNA-seq Data and Analysis Methods, Teaching practice with mock university students from University of Maine; received positive feedback from Dr. Michelle Smith and Master of Science Teacher Interns.
- 03/2008 - 06/2008 Independently mentored three senior undergraduate students for graduation thesis research.
- 03/2006 - 06/2006 Independently mentored a senior undergraduate student for graduation thesis research.

## **Professional Courses/meetings**

- 04/2020; 06/2020 American Association for Cancer Research meeting, online
- 08/2013 22<sup>nd</sup> Annual Short Course on Experimental Models of Human Cancer, The Jackson Laboratory, Bar Harbor, ME
- 05/2013 Short Course of The Whole Scientists, The Jackson Laboratory, Bar Harbor, ME
- 08/201-1/2011 Short Course on Genetics, The Jackson Laboratory, Bar Harbor, ME
- 09/ 2010; 06/2011 Grant Writing Short Course, The Jackson Laboratory, Bar Harbor, ME
- 28/10-04/11, 2012 Short Course on Systems Genetics, The Jackson Laboratory, Bar Harbor, ME
- 07/ 2010 51<sup>st</sup> Annual Short Course on Medical and Experimental Mammalian Genetics, The Jackson Laboratory and Johns Hopkins University