

Teresa Te-Ying Liu

University of Wisconsin – Madison
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Education

University of Tennessee Health Science Center **Memphis, TN**
Ph.D. in Microbiology/Mycology **2008**
Dissertation: "Transcriptional regulation of azole antifungal resistance in *Candida albicans*"

Westminster College **Fulton, MO**
B.A. in Biology and Computer Science **2002**

Research Experience

University of Wisconsin – Madison **Madison, WI**
Department of Urology **2015-present**
Investigator, NIH K Career Development Award Scholar
Mentor: William A. Ricke

- Examine the contribution of steroidogenesis on benign prostatic hyperplasia disease progression
- Define specific estrogen receptor gene networks using both high-throughput genomic techniques along with receptor dimerization assays
- Study the protective effects of estrogen receptor activation on BPH disease progression

University of Pittsburgh **Pittsburgh, PA**
Departments of Urology and Pharmacology **2013-2015**
Postdoctoral Scholar, Urology T32 Trainee
Mentors: Donald B. DeFranco, Zhou Wang, A. Paula Monaghan

- Study ER β contribution to benign prostatic hyperplasia disease progression and treatment response
- Examine apoptosis in response to 5 α -reductase inhibitors and NSAIDs
- Examine alterations in steroid hormone metabolism
- Examine alterations in prostaglandin E2 accumulation
- Test possible combination treatments to enhance efficacy

University of Pittsburgh **Pittsburgh, PA**
Department of Computational and Systems Biology **2010-2013**
Postdoctoral Associate
Mentors: Bino John, Donald B. DeFranco, A. Paula Monaghan

- Identified non-coding RNAs associated with YB-1 in prostate cancer
- Identified novel non-coding RNAs associated with disease progression
- Used cellular and molecular techniques to validate RNA-seq

Carnegie Mellon University **Pittsburgh, PA**
Department of Biological Sciences **2008-2009**
Postdoctoral Research Associate
Mentor: Aaron P. Mitchell

- Examined post-transcriptional modifications on transcriptional regulators responsible for antifungal drug resistance
- Screened knockout library for changes in chemotherapeutic response

University of Tennessee Health Science Center
Department of Pharmacy
Graduate student

Memphis, TN
2002-2008

Advisor: P. David Rogers

- Studied antifungal drug resistance in matched susceptible and resistant patient derived samples
- Developed custom Affymetrix microarrays to study global gene expression changes
- Identified transcriptional regulators responsible for altered gene expression in the development of resistance

Teaching Experience

University of Wisconsin – Madison
Toxicology 625 course instructor

Madison, WI
2015

- Endocrine Disruptors – Estrogen Receptors
- Endocrine Disruptors – Phthalates

University of Pittsburgh
Health Sciences Library Postdoctoral Teaching

Pittsburgh, PA
2013

- “DNA/RNA Immunoprecipitation and Next Generation Sequencing”
- How-to lecture on sequencing technologies and data analysis tools

University of Pittsburgh
UPCI Summer Institute Guest Lecturer

Pittsburgh, PA
2011-2013

- Taught central dogma to high school students using Bold Fold module
- Lectured on next generation sequencing and analysis tools

University of Pittsburgh
Summer Undergraduate Research Program Lecturer

Pittsburgh, PA
2011-2013

- Taught central dogma to undergraduate students using Bold Fold module
- Lectured on history of genomics, high-throughput sequencing technologies and analysis tools

University of Pittsburgh
Computational Genomics course instructor

Pittsburgh, PA
2011-2012

- Prepared and taught the introduction lectures on genes, genomics, and tools for analysis

University of Pittsburgh
Computational Biology journal club instructor

Pittsburgh, PA
2010

- Facilitated a weekly journal club on various computational biology related scientific articles
- Presentations were required and class was modeled after NIH study section

Carnegie Mellon University
Modern Biology course instructor

Pittsburgh, PA
2011-2012

- Co-taught a module of biology for non-majors to summer high school and undergraduate students
- Used active learning to teach the cell, respiration, and photosynthesis

Mentoring Experience

- Mentored high school, undergraduate, and graduate trainees, including research project design, laboratory supervision, and assistance with writing

University of Pittsburgh

Nadeige Chop, medical student
Racial disparity in prostate cancer

May – Sept 2015

- Received award for summer research project

Arianne Wilson, medical/graduate student <i>Racial disparity in prostate cancer</i>	May 2014 – Sept 2015
Amber Foster, undergraduate <i>Altered steroid metabolism in BPH and prostate cancer cell lines</i>	May – Aug 2014
Dan Lesky, medical student <i>EMT and wound healing in BPH-1</i>	May – Aug 2013
Jerome Watts, high school student <i>Relationship between androgens, non-coding RNAs, and prostate cancer</i>	June – Aug 2012
<ul style="list-style-type: none"> • Wrote abstract and paper for final project summary • Presented at the UPCI Summer Academy poster session • Presented at FAME (Fund for Advancement of Minorities Through Education) internship seminar 	

University of Tennessee Health Science Center

Erin Vasicek, graduate student <i>Transcriptional regulation pathways for azole resistance in Candida albicans</i>	Apr – Sept 2008
Stephanie Flowers, PharmD fellow <i>Azole resistance in Candida albicans</i>	Apr – Sept 2008

Awards and Fellowships

- Computational and Systems Biology Best Postdoc Award, 2012
- University of Tennessee Health Science Center Student Travel Award 2007
- Graduate Student Travel Grant, American Society for Microbiology, 8th *Candida* and Candidiasis, 2006
- University of Tennessee Health Science Center Student Travel Award, 2006
- Graduate Student Travel Grant, American Society for Microbiology, 44th ICAAC, 2004

Peer-Reviewed Publications

Total citations: 838 (determined by Google Scholar, January 7, 2016)

1. **Liu TT**, Grubisha MJ, Frahm KA, Wendell SG, Liu J, Ricke WA, Auchus RJ, DeFranco DB. Opposing effects of COX-2 on ER β response to 5 α -reductase inhibition in prostate epithelial cells. (submitted; under revision)
2. **Liu TT**, Arango-Argoty G, Li Z, Lin Y, Kim SW, Dueck A, Oszolak F, Monaghan AP, Meister G, DeFranco DB, John B. Identification of a large group of novel, short RNAs that associates with YB-1. *RNA* 2015; [epub ahead of print].
3. Solomon JD, Heitzer MD, **Liu TT**, Beumer JH, Parise RA, Normolle DP, Leach DA, Buchanan G, DeFranco DB. VDR activity is differentially affected by Hic-5 in prostate cancer and stromal cells. *Mol Cancer Res* 2014; 12:1166-80.
4. Lin Y, Oszolak F, Kim SW, Arango-Argoty G, **Liu TT**, Tenebaum SA, Bailey T, Monaghan AP, Milos PM, John B. An in-depth map of polyadenylation sites in cancer. *Nucleic Acids Res* 2012; 40:8460-71.
5. Lis M, **Liu TT**, Barker KS, Rogers PD, Bobek LA. Antimicrobial peptide MUC7 12-mer activates the calcium/calciurein pathway in *Candida albicans*. *FEMS Yeast Res* 2010; 10:579-86.
6. Znaidi S, Barker KS, Weber S, Alarco AM, **Liu TT**, Boucher G, Rogers PD, Raymond M. Identification of the *Candida albicans* Cap1p regulon. *Eukaryotic Cell* 2009; 8:806-20.
7. Dunkel N, **Liu TT**, Barker KS, Homayouni R, Morschhäuser J, Rogers PD. A gain-of-function mutation in the transcription factor Upc2p causes upregulation of ergosterol biosynthesis genes and increased fluconazole resistance in a clinical *Candida albicans* isolate. *Eukaryotic Cell*

- 2008; 7:1180-90.
8. Morschhäuser J, Barker KS, **Liu TT**, Blaß-Warmuth J, Homayouni R, Rogers PD. The transcription factor MRR1 controls expression of the MDR1 efflux pump and mediates multidrug resistance in *Candida albicans*. *PLoS Pathogens* 2007; 3:e164.
 9. **Liu TT**, Znaidi S, Barker KS, Xu L, Homayouni R, Saidane S, Morschhäuser J, Nantel A, Raymond M, Rogers PD. Genome-wide expression and location analyses of the *Candida albicans* Tac1p regulon. *Eukaryotic Cell* 2007; 49:2226-36.
 10. Rogers PD, **Liu TT**, Barker KS, Hilliard GM, English BK, Thornton J, Swiatlo E, McDaniel LS. Gene expression profiling of the response of *Streptococcus pneumoniae* to penicillin. *Journal of Antimicrobial Chemotherapy* 2007; 59:616-26.
 11. Barker KS, **Liu T**, Rogers PD. Coculture of THP-1 human mononuclear cells with *Candida albicans* results in pronounced changes in host gene expression. *Journal of Infectious Diseases* 2005; 192:901-12.
 12. **Liu TT**, Lee REB, Barker KS, Lee RE, Wei L, Homayouni R, Rogers PD. Genome-wide expression profiling of the response to azole, polyene, echinocandin, and pyrimidine antifungal agents in *Candida albicans*. *Antimicrobial Agents and Chemotherapy* 2005;49:2226-36.
 13. Lee REB, **Liu TT**, Barker KS, Lee RE, Rogers PD. Genome-wide expression profiling of the response to ciclopirox olamine in *Candida albicans*. *Journal of Antimicrobial Chemotherapy* 2005;55:655-62.

Book Chapters

1. **Liu TT**, Li Z, and John B. Enhanced detection of small RNAs using a non-radioactive approach. In: Werner, A, ed. *Animal Endo-siRNAs: Methods and Protocols*. New York, NY: Humana Press; 2014.

Conferences

* Denotes oral presentation given by T.T. Liu

1. **Liu TT**, Grubisha MJ, Wendell SG, Ricke W, Auchus RJ, DeFranco DB. COX-2 mediated inflammation alters intraprostatic steroid homeostasis in benign prostatic hyperplasia. *Integrated Systems Biology Symposia*. 2015.
2. **Liu TT**, Grubisha MJ, Wendell SG, Ricke W, Auchus RJ, DeFranco DB. COX-2 mediated inflammation alters intraprostatic steroid homeostasis in benign prostatic hyperplasia. *SBUR Fall Meeting*. 2014.
3. **Liu TT**, Arango-Argoty G, Li Z, Lin Y, Kim SW, Dueck A, Ozsolak F, Monaghan AP, Meister G, DeFranco DB, John B. Non-coding RNAs that associate with YB-1 regulates proliferation in prostate cancer cells. *Cell Symposia: Regulatory RNAs*. 2014.
4. **Liu TT**, Grubisha MJ, Wendell SG, Ricke W, Auchus RJ, DeFranco DB. 5 α -reductase inhibitors and COX-2 alter intraprostatic steroid homeostasis in benign prostate hyperplasia. *ICE/ENDO Meeting*. 2014.
5. **Liu TT**, Grubisha MJ, Ricke W, Auchus RJ, DeFranco DB. 5 α -reductase inhibitors and COX2 alter intraprostatic steroid homeostasis in benign prostatic hyperplasia. *NIDDK Directors Meeting*. 2013.
6. **Liu TT**, Grubisha MJ, Ricke W, Auchus RJ, DeFranco DB. 5 α -reductase inhibitors and COX2 alter intraprostatic steroid homeostasis in benign prostatic hyperplasia. *SBUR Fall Meeting*. 2013.
7. **Liu TT***, Grubisha MJ, Ricke W, Auchus RJ, DeFranco DB. 5 α -reductase inhibitors alter intraprostatic steroid homeostasis in benign prostatic hyperplasia. *Pittsburgh Area Nuclear Receptor Conference*. 2013.
8. Grubisha MJ, **Liu TT**, Wang Z, Auchus RJ, Hammes SR, DeFranco DB. Alteration of intraprostatic steroid metabolism by 5 α -reductase inhibitors potentiates ER β activity in benign prostatic hyperplasia. *ICE/ENDO Meeting*. 2013.
9. **Liu TT**, Znaidi S, Barker KS, Xu L, Homayouni R, Raymond M, Rogers PD. Target genes of *Candida albicans* Tac1p identified by genome-wide expression and location profiling. *Program and Abstracts of the 47th Interscience Conference on Antimicrobial Agents and Chemotherapy*.

10. **Liu TT**, Znaidi S, Barker KS, Xu L, Homayouni R, Morschhäuser J, Raymond M, Rogers PD. Identification of transcriptional activation targets of the transcription factor Tac1p associated with azole resistance in clinical isolates of *Candida albicans*. Program and Abstracts of the Federation of European Biomedical Societies Human Fungal Pathogenesis Conference. 2007.
11. Morschhäuser J, Barker KS, **Liu TT**, Homayouni R, Blaß-Warmuth J, Rogers PD. The transcription factor MRR1 controls expression of the MDR1 efflux pump and mediates multidrug resistance in *Candida albicans*. Program and Abstracts of the Federation of European Biomedical Societies Human Fungal Pathogenesis Conference. 2007.
12. **Liu TT**, Lis M, Rogers PD, Bobek L. Genome-wide expression profiling of the response to the antifungal cationic antimicrobial peptide MUC7 12-mer in *Candida albicans*. Program and Abstracts of the 46th Interscience Conference on Antimicrobial Agents and Chemotherapy.
13. **Liu TT**, Znaidi S, Barker KS, Xu L, Homayouni R, Raymond M, Rogers PD. Stereotypical changes in the gene expression profile of *Candida albicans* in response to the sterol biosynthesis inhibitors fenpropimorph, ketoconazole, and terbinafine. Program and Abstracts of the 16th Congress of the International Society for Human and Animal Mycology. 2006.
14. **Liu TT**, Znaidi S, Barker KS, Xu L, Homayouni R, Morschhäuser J, Raymond M, Rogers PD. Identification of transcriptional activation targets of the transcription factor Tac1p associated with azole resistance in clinical isolates of *Candida albicans*. Program and Abstracts of the 8th ASM Conference on *Candida* and Candidiasis. 2006.
15. Earhart KD, **Liu TT**, Vermitsky JP, Xu L, Homayouni R, Edlind TD, Rogers PD. PDR1-dependent and -independent changes in gene expression in response to fluconazole in *Candida glabrata*. Program and Abstracts of the 8th ASM Conference on *Candida* and Candidiasis. 2006.
16. Barker KS, Phan QT, Park H, Xu L, Homayouni R, **Liu T**, Rogers PD, Filler SG. Comparison of gene expression profiles of human umbilical vein endothelial cells induced by *Candida albicans* hyphae and blastospores by microarray analysis. Program and Abstracts of the 8th ASM Conference on *Candida* and Candidiasis. 2006.
17. Earhart KD, **Liu T**, Vermitsky JP, Xu L, Homayouni R, Edlind TD, Rogers PD. PDR1-dependent and -independent gene expression programs associated with azole resistance in *Candida glabrata* identified by microarray analysis. Program and Abstracts of the Annual Meeting of the American College of Clinical Pharmacy. 2005. 160.
18. Rogers PD, Hooshdaran MZ, **Liu TT**, Earhart K, Jiao Y, Xu L, Homayouni R, Hilliard GM, Gu W, Redding SW, Edlind TD. Molecular mechanisms of acquired azole antifungal resistance in clinical isolates of *Candida glabrata* identified through an integrated genetic, genomic, and proteomic approach. Program and Abstracts of the Annual Meeting of the American College of Clinical Pharmacy. 2005. 164.
19. Hooshdaran MZ, **Liu TT**, Barker KS, English BK, Hilliard GH, Thornton J, Swiatlo E, McDaniel LS, Rogers PD. Transcriptional modulation of gene expression in *Streptococcus pneumoniae* in response to subinhibitory concentrations of penicillin and clarithromycin. Program and Abstracts of the 45th Interscience Conference on Antimicrobial Agents and Chemotherapy.
20. Thornton, J, **Liu TT**, Homayouni R, Swiatlo E, English BK, McDaniel LS, Rogers PD. Modulation of the *Streptococcus pneumoniae*-induced gene expression profile of THP-1 human monocytic cells by sub-inhibitory concentrations of penicillin and clarithromycin. Program and Abstracts of the 45th Interscience Conference on Antimicrobial Agents and Chemotherapy.
21. Vermitsky JP, Smith WL, **Liu T**, Henry KW, Rogers PD, Edlind TD. *Candida glabrata* PDR1: genetic, genomic, and susceptibility studies. Program and Abstracts of the 45th Interscience Conference on Antimicrobial Agents and Chemotherapy.
22. **Liu TT**, Homayouni R, Alarco AM, Weber S, Raymond M, Rogers PD. Identification of transcriptional activation targets of the bZip transcription factor Cap1p in *Candida albicans* using genome-wide gene expression profile analysis. Program and Abstracts of the 45th Interscience Conference on Antimicrobial Agents and Chemotherapy.
23. **Liu TT**, Earhart K, Homayouni R, Patterson TF, Wiederhold NP, Burgess DS, Rogers PD. Genome-wide expression profile analysis reveals genes differentially expressed in association with azole and echinocandin cross resistance in a clinical isolate of *Candida glabrata*. Program and Abstracts of the 45th Interscience Conference on Antimicrobial Agents and Chemotherapy.
24. Neudeck BL, Alford TD, **Liu T**. Activation of P-glycoprotein During *Listeria monocytogenes* Infection. Presented at the American Society for Microbiology General Meeting. 2005.
25. **Liu TT**, Earhart K, Vermitsky JP, Xu L, Homayouni R, Edlind TD, Rogers PD. Genome-wide Expression Profile Analysis Reveals Genes Differentially Expressed in Association with

- Fluconazole Resistance in *Candida glabrata*. Program and Abstracts of the Federation of European Biomedical Societies Human Fungal Pathogenesis Conference. 2005.
26. **Liu T**, Lee REB, Barker KS, Walker LA, Clark AM, Rogers PD. Genome-wide expression profiling of the response to the novel antifungal alkaloids eupolauridine and sampangine in *Candida albicans*. Program and Abstracts of the 44th Interscience Conference on Antimicrobial Agents and Chemotherapy. 2004. M-1970.
 27. **Liu T**, Hooshdaran MZ, Barker KS, Rogers PD. Integrated functional genomic and proteomic analysis of ergosterol biosynthesis inhibition in *Candida albicans*. Program and Abstracts of the 44th Interscience Conference on Antimicrobial Agents and Chemotherapy. 2004. M-1972.
 28. Lee REB, Barker KS, **Liu T**, Lee RE, Wei L, Homayouni R, Rogers PD. Genome-wide expression profiling of the response to ciclopirox olamine in *Candida albicans*. Program and Abstracts of the 104th General Meeting of the American Society for Microbiology. 2004.
 29. Lee REB, Barker KS, **Liu T**, Lee RE, Wei L, Homayouni R, Rogers PD. Genome-wide expression profiling of the response to polyene, pyrimidine, azole, and echinocandin antifungal agents in *Candida albicans*. Program and Abstracts of the 7th American Society for Microbiology Conference on *Candida* and Candidiasis. 2004. 153.

Invited Talks and Seminars

1. **Liu TT**. The role of estrogen receptor activation on benign prostatic hyperplasia progression. NIDDK U54-P20 Directors' Meeting. Madison, WI, 2015
2. **Liu TT**, Grubisha MJ, Ricke W, Auchus RJ, DeFranco DB. Opposing roles for COX-2 in regulating ER β function in BPH. Madison, WI, 2015
3. **Liu TT**, Grubisha MJ, Ricke W, Auchus RJ, DeFranco DB. COX-2 mediated inflammation alters intraprostatic steroid homeostasis in benign prostatic hyperplasia. Molecular and Cellular Cancer Biology Program, 2015
4. **Liu TT**, Grubisha MJ, Ricke W, Auchus RJ, DeFranco DB. 5 α -reductase inhibitors alter intraprostatic steroid homeostasis in benign prostatic hyperplasia. BPH Symposium. 2013.

Interdepartmental and Public Seminars

1. "The role of estrogen receptor activation on benign prostatic hyperplasia progression." O'Brien Center Seminar Series, 2015
2. "5 α -reductase inhibitors alter intraprostatic steroid homeostasis in benign prostatic hyperplasia." Urology Research Conference, 2013
3. "Two large groups of non-coding RNAs reveal a novel RNA pathway." Department of Computational and Systems Biology Retreat, 2012

Professional Development and Service

Memberships in Professional and Scientific Societies

- University of Wisconsin Institute for Clinical and Translational Research (ICTR), 2015-present
- RNA Society, 2015-present
- SBUR, 2014-present
- Endocrine Society, 2014-present
- AAAS, 2010-present
- University of Pittsburgh Postdoctoral Association, 2010-2015
- FIRST IV Postdoctoral Scholar, 2009-present
- American Society for Microbiology, 2003-2012

Postdoctoral Training:

- RNA-seq workshop, 2013
- FIRST IV workshop, 2009-2010

Selected Techniques and Skills

- **Cellular and molecular biology:** cell culture, qRT-PCR, proliferation assays (MTT, Hoechts staining), fluorescence microscopy, immunohistochemistry, *in situ* hybridization, northern blotting, western blotting, Southern blotting, EMSA, flow cytometry (annexin V/PI for apoptosis), transient and stable gene transfection (lentiviral shRNA)
- **Computational biology:** high-throughput sequencing with Illumina and Helicos, sequence mapping with Bowtie and TopHat, expression analysis with Cufflinks, CHIP-seq analysis with Model-based Analysis for CHIP-seq (MACS), R, Perl

Public Outreach

- Judge at Pittsburgh Regional Science and Engineering Fair, 2014
- Volunteer/Lecturer at Tour Your Future Program for Girls, Math & Science Partnership, 2011
- Mentor for the Ethics Forum at the University of Pittsburgh for the Summer Undergraduate Research Program, 2010-2011