SHEN CHENG, PH.D.

</> WORK EXPERIENCE

02/2024 | now

Department of Experimental and Clinical Pharmacology, University of Minnesota, Twin Cities
Assistant Professor in Pharmacometrics   📍 Minneapolis, MN

07/2022 | 02/2024

Metrum Research Group
Research Scientist I   📍 Connecticut, CT

01/2022 | 06/2022

Metrum Research Group
Research Associate II   📍 Connecticut, CT

🎓 EDUCATION

2017 | 2021

University of Minnesota, Twin Cities
Ph.D. in Experimental and Clinical Pharmacology   📍 Minneapolis, MN
(major in Pharmacometrics, minor in Biostatistics)

Thesis: Understanding the Impact of Pharmacogenetic Differences in Drug-drug Interactions (DDIs): a Model-based Approach to Predict Differences in Drug Exposure

2015 | 2017

University of Michigan, Ann Arbor
M.S. in Pharmacology   📍 Ann Arbor, MI

Thesis: Preparation and characterization of the complexes of cytochrome P450 2B4 and its redox partners in Amphipol A8-35

2010 | 2014

Soochow University
B.S. in Biological Sciences   📍 Suzhou, China

CONTACT INFO

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📞 +1 734-846-0741

in Linkedin

G Google Scholar

🗺 808 Berry St. Apt.390
Saint Paul, MN 55114
For more information, please contact me via email.

PROFESSIONAL MEMBERSHIPS

International Society of Pharmacometrics (ISoP)

American Society of Clinical Pharmacology and Therapeutics (ASCPT)

American College of Clinical Pharmacology (ACCP)

🖥 SKILLS

- **Pharmacometric Skills**
- Nonlinear mixed-effect modeling using NONMEM (GUI: Pirana, bbr–bbi, PDx–Pop), Monolix, Phoneix NLME, Julia Pumas and SAAM 2.
- Monte carlo simulations (mrgsolve, NONMEM, STELLA, Simulx, etc).
- Pharmacometric toolbox, including PsN and MetrumRG expo.
- Concepts and implementations of population PK-PD modeling using various algorithms (e.g., maximum likelihood estimations, EM-based algorithm and Bayesian approach).
- Physiological-based PK (PBPK) modeling concepts and skills with Simcyp and mrgsolve.
- PK non-compartmental analysis (NCA).

- **Statistical and Programming Skills**
- Data wrangling, function writing, data set management and data visualization using R (baseR, tidyverse, data.table, etc).
- Version control platform using Github and Subversion.
- R package development.
- Statistical analysis and modeling, especially mixed-effect modeling (saemix, lme4).
- Biological data analysis using software such as *GraphPad Prism* and *Sigmaplot*.

- **Experiemntal Skills**
- Bio-analytical techiniques (FPLC, HPLC, SEC, MALS, UV/vis, LC/MS, ELISA and flow-cytometry)
- Protein chemistry (protein expression, purification and characterization, proteomic analysis, western blot and chemical cross-linking)

- **Scientific Communication Skills**
- Scientific presentations.
- Scientific writing: Latex, Quarto, Rmarkdown and *MS office*.

📄 REVIEWER EXPERIENCE

- **Journal Reviewer**
- ACS Omega
- Biomedicine & Pharmacotherapy
- Clinical and Experimental Pharmacology and Physiology
- Clinical Pharmacology and Therapeutics
- CPT: Pharmacometrics and System Pharmacology
- European Journal of Drug Metabolism and Pharmacokinetics
- Journal of Clinical Pharmacology
- Journal of Pharmacology and Experimental Therapeutics
- Journal of Pharmacokinetics and Pharmacodynamics
- Antibiotics
- International Journal of Molecular Sciences
- Current Issues in Molecular Biology
- Polymers
- Drug Metabolism and Disposition
- Mathematics

- **Abstract Reviewer**
- American Conference of Pharmacometrics (ACoP) 14

- **Proposal Reviewer**
  - American Society of Clinical Pharmacology and Therapeutics (ASCPT) 2024 Annual Meeting

🖥 RESEARCH EXPERIENCE

2022 | 2024

Research Scientist

Metrum Research Group ⚲ Connecticut, CT

Supervisor: Dr. Curtis Johnston

- Worked on diverse pharmacometric modeling and simulation projects with clients (i.e., pharmaceutical and biotechnology companies), ranging from small molecule drugs to complex biologics conducting mechanistic and translational modeling, to support either early-phase clinical dose selections or regulatory submissions.
- Led the internal research efforts of implementing Sampling Importance Resampling (SIR) methodology to assess parameter uncertainty in pharmacometric analysis.
- Developed new functions in R package `simpar` for pharmacometric and statistical parameter uncertainty.
- Contributed to the construction of a model library in a AWS-based pharmacometric platform.
- Delivered scientific presentations, either internally (i.e., seminars) and externally (i.e., client meetings and conferences), to disseminate pharmacometric research outcomes and methodologies.

2017 | 2021

Graduate Research Assistant

University of Minnesota, Twin Cities ⚲ Minneapolis, MN

Advisor: Dr. Richard Brundage; Co-adviser: Dr. Mahmoud Al-Kofahi

- **Thesis project**: Pharmacometric model-based analyses to investigate the impact of CYP2C9 genetic polymorphism on clinical drug-drug interactions (DDIs) of probe drugs (warfarin, flurbiprofen, tolbutamide, ketoprofen).
- Worked on PK/PD modeling of paclitaxel delivered by mesenchymal stem cells (MSCs) to optimize its preclinical dosing regimen and identify properties to further optimize its effectiveness.
- Worked on population PK analysis of vancomycon in Egyptian population.
- Worked on population PK modeling of atomoxetine and its metabolites.
- Worked on PBPK modeling of eliglustat for its dose optimization for the treatment of Gaucher Disease (GD).
- Pharmacometric methodology investigations.
- Performed data fitting using NONMEM on a daily basis.
- Data wrangling, analysis and visualization with R extensively.

2015 | 2017

Graduate Research Assistant

University of Michigan, Ann Arbor ⚲ Michigan, MI

Advisor: Dr. Haoming Zhang; Co-advisor: Dr. Yoichi Osawa

- **Thesis project**: Preparation and characterization of CYP2B4 complexes and its redox partners formed in amphipol A8-35
- Performed preclinical PK study (data collection and NCA analysis) of ClopNPT-a novel anti-platelet drug.
- Investigated the binding sites for cytochrome P450 BM3 dimerization by chemical crosslinking and high-resolution mass spectrometry.
- Investigated the inhibitory effects of experimental compounds on the interaction of CYP17A1 and Cytochrome b5.
- Extensive experimental experience on in vitro CYP enzyme characterization including protein expression and purification, chromatography analysis and activity analysis using spectrophotometry and mass spectrometry.

💼 PROFESSIONAL EXPERIENCE

2021

Pharmacometrics, Intern

Novartis ⚲ Boston, MA

- Translational PK-PD modeling of CAR-T cell therapies.

2020 • **Biomolecule PK-PD, Intern**
Eli-Lilly and Company   ◉ Indianapolis, IN
• Retrospective analysis on CL and V of mAbs in various animals species to identify allometric scaling exponents.

👥 TEACHING EXPERIENCE

2020 • **Modeling Biologics (ECP8440)**
Discussion moderator to illustrate modeling and simulation performed with various TMDD models
◉ University of Minnesota, Twin Cities, MN

2019
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2020 • **Acute Patient Care Pharmacotherapy (PHAR6786)**
Teaching assistant (prepare exams, grading and moderate team-based learning)
◉ University of Minnesota, Twin Cities, MN

2019 • **Medicinal Chemistry and Pharmacology of Cardiovascular Agents (PHAR 6732)**
Teaching assistant (prepare exams and grading)   ◉ University of Minnesota, Twin Cities, MN

2017
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2018 • **Kidney, Fluid and Electrocytes (PHAR 6756)**
Teaching assistant (prepare course materials, exams and grading)   ◉ University of Minnesota, Twin Cities, MN

2017
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2018 • **Advanced Pharmacy Practice Experience (PHAR7401, 7433)**
Teaching assistant (grading)   ◉ University of Minnesota, Twin Cities, MN

✒️ PUBLICATIONS IN PREPARATION

2024
Expected • **A Model-based Analysis of the CYP2C9 Genotype Effects on the Fluconazole Inhibition of Flurbiprofen, Ketoprofen and Tolbutamide.**
In Preparation

2023
Expected • **A Model-based Analysis of Preclinical to Clinical Scaling of Chimeric Antigen Receptor (CAR) T-Cell Therapy.**
In Preparation

📄 PUBLICATIONS

2023 • **Population Pharmacokinetic Analysis of Atomoxetine and its Metabolites in Children and Adolescents with Attention-Deficit/Hyperactivity Disorder (ADHD).**
Clinical Pharmacology and Therapeutics (CPT), December, 2023. DOI: 10.1002/cpt.3155.
Cheng S., Al-Kofahi M., Leeder S., Brown J.

2023 • **A physiological-based pharmacokinetic model embedded with a target mediated drug disposition mechanism can characterize single dose warfarin pharmacokinetic profiles in subjects with various CYP2C9 genotypes under different co-treatments.**
Drug Metabolism and Disposition (DMD), February 2023, 51 (2) 257-267, DOI: https://doi.org/10.1124/dmd.122 .001048
Cheng S., Flora D.R., Rettie A.E., Brundage R.C., Tracy T.S.

2022 • **PBPK Model Development, Validation and Application for Prediction of Eliglustat Drug–Drug Interactions.**
Clinical Pharmacology and Therapeutics (CPT), September 3, 2022, DOI: 10.1002/cpt.2738.
Sahasrabudhe S.A., **Cheng S.**, Al-Kofahi M., Jarnes J.R., Weinreb N.J., Kartha R.V.

2022 ● **Pharmacokinetic Modeling of Warfarin I – Model-based Analysis of Warfarin Enantiomers with a Target Mediated Drug Disposition Model Reveals CYP2C9 Genotype-dependent Drug-drug Interactions of S-Warfarin.**
Drug Metabolism and Disposition (DMD), July 7, 2022, DMD-AR-2022-000876; DOI: https://doi.org/10.1124/dmd.122.000876
Cheng S., Flora D.R., Rettie A.E., Brundage R.C., Tracy T.S.

2022 ● **Pharmacokinetic Modeling of Warfarin II – Model-based Analysis of Warfarin Metabolites following Warfarin Administered either Alone or Together with Fluconazole or Rifampin.**
Drug Metabolism and Disposition (DMD), July 7, 2022, DMD-AR-2022-000877; DOI: https://doi.org/10.1124/dmd.122.000877
Cheng S., Flora D.R., Rettie A.E., Brundage R.C., Tracy T.S.

2021 ● **Understanding the impact of pharmacogenetic differences in drug-drug interactions (DDIS): A model-based approach to predict differences in drug exposure.**
University of Minnesota ProQuest Dissertations Publishing; [Order No. 28870041].
Cheng S.

2021 ● **Evaluation of Bias in Weighted Residual Calculations When Handling BLQ Data Using Beal's M3 Method.**
CPT: Pharmacometrics & Systems Pharmacology (PSP), 10(4):275-278; 10.1002/psp4.12616
Jaber M. M., **Cheng S.**, Brundage R.C.

2021 ● **Amphipol-facilitated Elucidation of the Functional Tetrameric Complex of Full-length Cytochrome P450 CYP2B4 and NADPH-Cytochrome-P450 Oxidoreductase.**
J Biol Chem, 100645; 10.1016/j.jbc.2021.100645
Cheng S., Bo Z., Hollenberg P.F., Osawa Y., and Zhang H.

2021 ● **Pharmacokinetic-Pharmacodynamic (PK-PD) Modeling of Tumor Targeted Drug Delivery using Nano-engineered Mesenchymal Stem Cells (Nano-MSCs).**
Pharmaceutics, 13(1), 92; 10.3390/pharmaceutics13010092
Cheng S., Nethi S.K. Al-Kofahi M., Prabha S.

2019 ● **Engineered Mesenchymal Stem Cells for Targeting Solid Tumors: Therapeutic Potential beyond Regenerative Therapy.**
J Pharmacol Exp Ther, 370(2), 231-241. 10.1124/jpet.119.259796
Cheng, S., Nethi, S. K., Rathi, S., Layek, B., Prabha, S.

2018 ● **The full-length cytochrome P450 enzyme CYP102A1 dimerizes at its reductase domains and has flexible heme domains for efficient catalysis.**
J Biol Chem, 293(20), 7727-7736. 10.1074/jbc.ra117.000600
Zhang, H., Yokom, A. L., **Cheng, S.**, Su, M., Hollenberg, P. F., Southworth, D. R., Osawa, Y.

2014 ● **Phoxim-induced damages of Bombyx mori larval midgut and titanium dioxide nanoparticles protective role under phoxim-induced toxicity.**
Environ Toxicol, 29(12):1355-66. 10.1002/tox.21866
Su J., Li B., **Cheng S.**, Zhu Z., Sang X., Gui S., Xie Y., Sun Q., Cheng Z., Cheng J., Hu R., Shen W., Xia Q., Zhao P., Hong F.

2014 **Nano-sized titanium dioxide-induced splenic toxicity: a biological pathway explored using microarray technology.**
J Hazard Mater. 278:180-8. 10.1016/j.jhazmat.2014.06.005

Sheng L., Wang L., Sang X., Zhao X., Hong J., **Cheng S.**, Yu X., Liu D., Xu B., Hu R., Sun Q., Cheng J., Cheng Z., Gui S., Hong F.

📊 POSTERS AND PRESENTATIONS

2024
Accepted **Population Pharmacokinetics of Trastuzumab Deruxtecan (T-DXd) in Subjects with HER2-mutant and HER2-overexpressing Non-Small Cell Lung Cancer (NSCLC)**
American Society of Clinical Oncology (ASCO) 📍 Chicago, IL

Khatri A., Cobbina E., **Cheng S.**, Abutarif M., Garimella T.

2024
Accepted **Population Pharmacokinetic / Pharmacodynamic Analysis of Garadacimab, in Patients with Hereditary Angioedema**
American Academy of Allergy Asthma & Immunology (AAAAI) 📍 Washington, DC

Glassman F., Sharma A., **Cheng S.**, Johnston C., DeMiguelLillo B., Lawo J., Jacobs I., Polhamus D., Nandy P.

2023 `simpar`: **an R Package for Parameter Uncertainty Simulations in Pharmacometric Modeling**
American Conference of Pharmacometrics (ACOP) 14 📍 National Harbor, MD

Cheng S., Green S., Marinelli R., Baron K.T.

2023 **Population Pharmacokinetic (PK) and Exposure-Response (ER) Analysis of Empagliflozin in Pediatric Patients with Type 2 Diabetes Mellitus (T2DM)**
American Conference of Pharmacometrics (ACOP) 14 📍 National Harbor, MD

Cheng S., Lennie J., Reilly B., Kawakatsu S., Kay K., Wang X., Johnston C., Tartakovsky I., Nock V.

2023 **Population Pharmacokinetic (PK) and Exposure-Response (ER) Analysis of Linagliptin in Pediatric Patients with Type 2 Diabetes Mellitus (T2DM)**
American Conference of Pharmacometrics (ACOP) 14 📍 National Harbor, MD

Reilly B., Kawakatsu S., Baron K.T., **Cheng S.**, Lennie J., Kay K., Johnston C., Wang X., Tartakovsky I., Nock V.

2022 **Population pharmacokinetics of atomoxetine and its metabolites in children and adolescents with attention-deficit/hyperactivity disorder (ADHD)**
American Society for Clinical Pharmacology and Therapeutics (ASCPT) Annual Meeting 📍 Virtual

Al-Kofahi M., **Cheng S.**, Leeder S., Brown J.

2021 **A physiological-based pharmacokinetic (PBPK) model embedded with a target mediated drug disposition (TMDD) mechanism can characterize S-warfarin pharmacokinetic (PK) profiles in subjects with various CYP2C9 genotypes under different co-treatments**
American Conference of Pharmacometrics (ACOP) 12 📍 Virtual

Cheng S., Flora D.R., Tracy T. S., Rettie A.E., Brundage R.C.

2021 **Model-based analysis of the CYP2C9 genotype impact on the fluconazole inhibition of the commonly prescribed drugs flurbiprofen, ketoprofen, and tolbutamide**
American College of Clinical Pharmacology (ACCP) Annual Meeting 📍 Virtual

2020 **Application of a target-mediated drug disposition (TMDD) model for warfarin**
Certara UMN webinar 📍 Virtual
Cheng S.

2020 Genotype-dependent changes in warfarin clearance upon co-administration of an inhibitor (fluconazole) and an inducer (rifampin): A model-based analysis
American Conference of Pharmacometrics (ACOP) 11 📍 Virtual

2019 Elucidating the disposition of nano-engineered mesenchymal stem cells using pharmacokinetic modeling.
9th Annual Masonic Cancer Center (MCC) Cancer Research Symposium 📍 Minneapolis, MN
Cheng S., Layek B., Al-Kofahi M., Brundage R. C., Prabha S.

2019 Elucidating the disposition of nano-engineered mesenchymal stem cells using pharmacokinetic modeling
American Conference of Pharmacometrics (ACOP) 10 📍 Orlando, FL
Cheng S., Layek B., Al-Kofahi M., Brundage R. C., Prabha S.

2019 Synthetic antigen receptor mesenchymal stem cells (SAR-MSCs) targeting perlecan for drug delivery to ovarian cancer.
American Association for Cancer Research (AACR) Annual Meeting 📍 Atlanta, GA
Nethi S.K., Sehgal D., Cheng S., Panyam J. and Prabha S.

2017 Preparation and characterization of the complex of cytochrome P450 2B4 and cytochrome P450 oxidoreductase incorporated into Amphipol A8-35.
12th Great Lake Drug Metabolism and Disposition Group (GLDMDG) Annual Meeting 📍 Kalamazoo, MI
Cheng S., Yokom A. L., Hollenberg P. F., Southworth D. R., Osawa Y., Zhang H.

🏅 HONORS AND AWARDS

2021 **Award Winner, Trainee Communication Challenge**
American Conference of Pharmacometrics (ACOP) 12 📍 Virtual (international conference)

2021 **Doctoral Dissertation Fellowship (DDF, Highly competitive)**
University of Minnesota, Twin Cities 📍 Minneapolis, MN

2021 **Honorable Mentions, Rho Chi Research Day**
College of Pharmacy, University of Minnesota, Twin Cities 📍 Minneapolis, MN

2018 **ECP Fellowship**
Department of Experimental and Clinical Pharmacology, University of Minnesota, Twin Cities 📍 Minneapolis, MN

2017 **ECP Recruitment Fellowship**
Department of Experimental and Clinical Pharmacology, University of Minnesota, Twin Cities 📍 Minneapolis, MN

2014 **Outstanding Graduate**
Medical College, Soochow University 📍 Suzhou, China

2013 **Technology Innovation Scholarship**
Soochow University 📍 Suzhou, China

2013 **College Merited Student Scholarship**
Medical College, Soochow University 📍 Suzhou, China

2013 **Third prize of Undergraduate Science and Technology Contests**
Jiangsu Province 📍 China

⊛ ACTIVITIES

2020
Organized and moderated ECP graduate student research forum
University of Minnesota College of Pharmacy Annual Research Day   📍 Minneapolis, MN

2020
Planned and Organized "R for Pharmacometrics Summer Workshop" with Senior Graduate Students
Department of Experiemental and Clinical Pgarmacology, University of Minnesota   📍 Minneapolis, MN

2019 | now
Member of ISoP Student Community Communication Group
International Society of Pharmacometrics (ISoP)   📍 International professional organization

2019
Planned and Organized "R for Pharmacometrics Summer Workshop" with Senior Graduate Students
Department of Experiemental and Clinical Pgarmacology, University of Minnesota   📍 Minneapolis, MN

✹ WORKSHOPS

2023
An introduction to probabilistic decisions support in drug development
Pharmetheus at American Conference of Pharmacometrics (ACOP) 11   📍 National Harbor, MD

2021
Pharmacometrics Spring School: Modeling using MonolixSuite
Lixoft, SimulationsPlus   📍 Virtual

2020
An open-source Pharmacometrician's workflow in R: from exploration (xGx) to model building (nlmixr) and diagnostics (ggPMX)
American Conference of Pharmacometrics (ACOP) 11 Trainee Tutorial #1   📍 Virtual

2020
Intermediate & Advanced NONMEM & PDx-Pop Workshop
NONMEM & PDx-Pop develoment team, ICON Clinical Research LLC   📍 Virtual

2020
Introductory NONMEM & PDx-Pop Workshop
NONMEM & PDx-Pop develoment team, ICON Clinical Research LLC   📍 Virtual

2020
Pumas DDMoRe Bootcamp
Pumas development team, Pumas-AI Inc   📍 Virtual

2020
Bayesian Statistics: From Concept to Data Analysis
University of California, Santa Cruz, Coursera   📍 Online courses

2019
Machine Learning
Stanford University, Coursera   📍 Online courses

2019
Quantitative Systems Pharmacology in Translational Drug Development
American Conference of Pharmacometrics (ACOP) 10 Trainee Tutorial   📍 Orlando, FL

2019
Introduction to bayesian pharmacometric data analysis with NONMEM
MetrumRG at American Conference of Pharmacometrics (ACOP) 10   📍 Orlando, FL

2019
Pharmacometric statistics workshop
Taca training (Dr. Adrian Dunne)   📍 Dublin, Ireland

2019
Minnesota Pharmacometrics Summer Workshop (MPSW)
College of Pharmacy at University of Minnesota   📍 Minneapolis, MN

2018
Simcyp UMN 2-day workshop
College of Pharmacy at University of Minnesota   📍 Minneapolis, MN

2017
Advanced R Workshop in mrgsolve
College of Pharmacy at University of Minnesota (Dr. Kyle Baron)   📍 Minneapolis, MN