

KYLE BARRETT

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SUMMARY

As a data science engineer with a focus on R package and Shiny app development, I bring a strong skill set and extensive experience to the table. My academic background in Chemical Engineering, combined with my research experience in PKPD modeling, biological colloids, and image analysis, has provided me with a solid foundation in data analysis and software development. Since graduating from Drexel University in 2019, I have honed my expertise in R programming and shiny app development.

Having primarily programmed in pharmacometrics, I have become proficient in NONMEM, PsN/Pirana, and many other R packages commonly used in the industry. I take pride in designing, building, testing, and validating R packages from start to finish. Additionally, I have developed new Shiny widgets using R, HTML, and CSS, and have presented R Shiny, RSCoconnect, and Git trainings to both colleagues and clients.

My goal is to continue expanding my knowledge base in R package and Shiny app development, while also learning and developing new software in the field. I am dedicated to further developing my skills in data analysis and visualization, using these skills to create innovative solutions to complex problems. With a keen eye for detail and a passion for excellence, I am confident in my ability to make valuable contributions to any data-driven organization.

HIGHLIGHTED SKILLS

- Design, Development, Testing, and validation of R packages
- Advanced R Shiny app development; including designing custom shiny widgets, styling via CSS/html, and use of inline JavaScript.
- Data analysis and visualization
- Version control (via Git and SVN) and software validation
- Project management and organization.

EXPERIENCE

- 01/2021 to Present**
- Data Science Engineer I → II**
- Metrum Research Group**
- Developed and maintained numerous R packages relating to [NONMEM model management & submission](#), data visualization ([pmforest](#), [pmpplots](#), etc.), data summarization and formatting (exported as latex, HTML, RTF, or MS word), and software validation. The full list can be seen [here](#).
 - These packages bundled together facilitate model development and submission, and are outlined in Metrum's [Expo](#).
 - Designed and personalized R shiny apps for internal tool development and external client needs, two of which stood out due to their complexity and innovative features:
 - Shiny app package to contain and distribute reusable shiny modules and custom shiny widgets for creating more portable shiny code across multiple client projects.
 - Complex shiny app for filtering a database with numerous interactive visualizations, statistical summaries, and parameterized report generation.
 - Presented hands-on trainings for R and R shiny programming.
 - Worked on client projects within the scope of data assembly, EDA tables and figures, PK simulation, data visualization and report generation.
 - Helped validate and write tests for our cloud computing platform, [Metworx](#).
 - Trained new hires on Git, R programming, and R shiny app development.
- 09/2020 to 12/2020**
- Developer (Consultant)**
- Critical Path Institute**
- Designed a clinical trial simulation tool for patients with Duchenne Muscular Dystrophy.
 - The R shiny app simulated the impact on five unique endpoints, displayed visualizations of patient demographics, tabulated relevant statistical parameters for each simulation, and allowed for report generation of all findings.
- 04/2020 to 09/2020**
- R Shiny Developer (Consultant)**
- Cetara**
- Designed (and improved earlier iterations of) R shiny apps for modeling the pharmacokinetics and pharmacodynamics of numerous drugs for Covid-19
 - The apps are displayed on the Covid-19 Pharmacology Resource Center: <https://www.covidpharmacology.com/in-silico-workbench/>
- 08/2019 to 12/2019**
- Research Assistant**
- Optical Diagnostics for Diseased Tissue Lab at Tufts University** – Medford, MA
- Utilized image analysis techniques to define geometric parameters of mitochondria in epithelial tissue, and explore correlation with other biological parameters.

- Took graduate classes in optics (physics), biomedical engineering, and statistical inference.

3/2018 to 01/2019

Pharmacometrician/ R Shiny Developer

Teva Pharmaceuticals – Malvern, PA

- Enhanced the Teva modeling and simulation workflows via R and python packages, migrating from standard solutions (e.g., NONMEM)
- Wrote custom scripts and R shiny apps for data analysis and post processing, including bootstrapping, simulation, re-estimation, and visual predictive checks (VPC's), capable of utilizing a variety of model specifications and datasets.
- Evaluated one and two compartmental models for monoclonal antibody drug candidates.
- Worked with package developers on GitHub to fix bugs and expand functionality of numerous R packages designed for pharmacometricians.

01/2017 to 03/2018

Research Assistant

Biological Colloids Lab at Drexel University – Philadelphia, PA

- Aided in development of working assay to porate liposomal nested microbubbles and perfluorocarbon (PFC) nanoemulsions, using an applied electric field and focused ultrasound. This assay was designed to elucidate oxygenated muscle tissue in the myocardium when exposed to ultrasound. Dark areas would denote blockages and/or non-oxygenated tissue, helping to prevent and diagnose heart attacks.
- Designed (3D print physical model) experimental *in vitro* apparatus; participated in live pig trials to test and optimize the assay.
- Performed a FRET (forester resonance energy transfer) study using the 3D printed design to investigate the mechanism by which the nested particles leak their inner aqueous solution.

03/2016 to 09/2016

Pharmacometrician (Student)

Metrum Institute – Tariffville, CT

- Constructed a physiologically based pharmacokinetic (PBPK) model of Voriconazole using R and C++ to explore the contribution of gut metabolism in pediatric patients.
- Implemented PBPK model solution using Metrum's R package, mrgsolve – a tool for simulation of ODE-based PK/PD and systems pharmacology models. Defined intra-variability and inter-variability within simulated patient datasets using diagonal matrices.
- Built a prototype R Shiny web app to permit interactive analyses (data visualizations).

06/2014 to 10/2015

Pharmacy Technician

Oxford Valley Pharmacy – Oxford Valley, PA

- Filled prescriptions for patients and nursing homes; compounded and pipetted solutions as required. Operated specialized machinery for packaging and delivery.
- Performed emergency and time sensitive deliveries to nursing homes and individual patients.

06/2010 to 08/2013

Summer Intern

Children's Hospital of Philadelphia – Philadelphia, PA

- Performed protein binding experiments (ultrafiltration) of Aprepitant (NK1r antagonist) in human and animal plasma samples.
- Participated in early development of apple/android app to predict pediatric patient weights from digital images

EDUCATION AND TRAINING

12/2019

Tufts University – Medford, MA

06/2019

Bachelor of Science: Chemical Engineering

Drexel University – Philadelphia, PA

ADDITIONAL ACCOMPLISHMENTS/HONORS

- Dean's List & A.J Drexel Scholarship, Drexel University, 2014 - 2019
- Leadership Engineering Learning Community (ELC), Drexel University, 2014
- Engineering Honors Society (Tau Beta Pi), Drexel University, 2017-2019
- Chemical & Biological Engineering Student Achievement Award, Drexel University, 2017
- Graduated Magna Cum Laude (3.86), Drexel University, 2019

PUBLICATIONS

- Huang Z, Barrett JS, Barrett K, Barrett R, Ng, CM. Novel method to predict body weight in children based on age and morphological facial features. *The Journal of Clinical Pharmacology*, 2015; 55: 447–451.
- Huang Z, Barrett JS, Barrett K, Barrett R, Ng, CM. Estimation of Body Weight in Children Based on Age and Morphological Facial Features. AAPS Annual Meeting and Exposition, At San Diego, CA 2014
- Cimorelli M, Angel B, Fafarman A, Kohut A, Andrien B, Barrett K, Wrenn SP. Introducing a nested phase change agent with an acoustic response that depends on electric field: A candidate for myocardial perfusion imaging and drug delivery. *Applied Acoustics*, 2018: 138: 9-17.
- Barrett JS, Spitsin S, Moorthy G, Barrett K, Baker K, Lackner A, Tulic F, Winters A, Evans DL, Douglas SD. Pharmacologic rationale for the NK1R antagonist, Aprepitant as adjunctive therapy in HIV. *J Transl Med*. 2016;14:148.
- Barrett JS, Moorthy WD, Srivastata G, Barrett K, Spitsin KJ, Tuluc S, et al. Preclinical activity predicts higher dosing requirements for the NK-1r antagonist Aprepitant in HIV-associated neurocognitive disorders (HAND): Dispositional and pharmacologic rationale for multimodal therapeutic window. *Clin Pharmacol Therapeut* 2013; 93 Suppl 1:S17.PI-9.

- Cimorelli M, Andrien B, Barrett K, Fafarman A, Kohut A, Wrenn S. Electric Field Activation of Nested Ultrasound Contrast Agents: In Vitro and In Vivo Investigations. ACS: Colloid & Surface Science Symposium, At City College of New York, 2017; 91
- Elmokadem A, Gastonguay M, Baron K, Barrett K, Zane N, Yankee T, Riggs M. Application of an Open-source Physiologically-based Pharmacokinetic Model of Voriconazole to Explore Apparent Pharmacokinetic Differences between Adults and Children. CPT: Pharmacometrics and Systems Pharmacology, 2018 (Submitted)

PORTFOLIOS

Repositories, publications, and other examples of previous work

- GitHub: <https://github.com/barrettk>
- Research Gate: https://www.researchgate.net/profile/Kyle_Barrett6
- LinkedIn: <https://www.linkedin.com/in/kyle-barrett-434926b9/>