# KYLE **BARRETT**

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## SUMMARY

I have research and lab experience in PKPD modeling, biological colloids, and image analysis. More recently I have focused on developing my proficiency in software development, with an emphasis on creating tools and automating certain processes using R/R Shiny, C++, and HTML/CSS. My programming experiences have often been related to pharmacokinetic modeling and simulation (PBPK and PKPD) and R shiny app development, though I have also modeled anaerobic digestion (See GitHub and ResearchGate portfolios) and created several other web apps. My intended focus is to continue expanding my knowledge base in software development, learn more innovative modeling techniques, and further develop my skills in data analysis and visualization.

## SKILLS

- Data analysis and visualization
- Building interactive solutions using a variety of programming tools
- Mathematical modeling and statistics
- Project management and organization

## EXPERIENCE

**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**

**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 PBPBK 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 permit interactive analyses (display data visualizations) for Teva staff.

**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/KyleBarrett/AnaerobicDigestion
- Research Gate: https://www.researchgate.net/profile/Kyle_Barrett6
- LinkedIn: https://www.linkedin.com/in/kyle-barrett-434926b9/