Sanjin **Hosic**

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Summary

Principal Data Scientist with a Ph.D. in Chemical Engineering and 6+ years transforming biopharma manufacturing data into actionable insights. I build predictive models, automated pipelines, and interactive dashboards that help CMC teams forecast risks before they happen—from pre-IND development through FDA-approved commercial production.

Technical Skills

- **Languages:** R (Advanced), Python (Working), SQL (Working)
- **R Packages:** Bayesian (`brms`, `bayesplot`), Mixed-Effects (`lme4`, `glmmTMB`), Machine Learning (`tidymodels`, `glmnet`), Viz (`ggplot2`, `plotly`, `gt`), Apps (`shiny`), Workflow (`renv`, `here`)
- **Methodologies:** Design of Experiments (DoE), Multivariate Linear Regression (OLS, GLM, Mixed-models, Bayesian)
- **Tools:** Git, GitHub, GitLab (CI/CD), Docker, OpenShift, JMP, RStudio, VS Code, Linux (WSL/Ubuntu), Databricks
- **Therapeutic Focus:** Cell & Gene Therapy (CAR-T), Flow Cytometry
- **CMC & Regulatory:** Process Characterization, Quality by Design (QbD), Risk Assessment, IND/BLA Filings

Experience

Novartis — Cambridge, MA

Senior Expert / Principal Data Scientist – CMC — Nov 2021 - Present

- Architected an enterprise CAR-T analytics platform (R/Shiny) serving 4 global manufacturing sites (North America & Europe), integrating automated ETL, NLP-driven root cause classification, batch specification testing, and failure mode analysis. Reduced recurring analysis time from 2-3 days to under 1 hour with near-daily updates across 300 batches—enabling data-driven decision-making for global clinical trials.
- Developed a biomarker data integration pipeline (R/tidyverse) reconciling 3 clinical and manufacturing systems across 128 patients, 309 batches, and 30,000 flow cytometry records spanning 2 therapeutic areas (Oncology, SLE). Automated cross-system identifier reconciliation that previously required ad-hoc coordination between system owners—enabling translational biomarker analyses that have supported 3 of 9 OOS manufacturing investigations in 2025.
- Built a machine learning framework (R/tidymodels) predicting CAR-T product quality and manufacturing outcomes from patient apheresis T-cell immunophenotype across 105+ batches spanning 2 clinical indications (Oncology, SLE) and healthy donors—enabling prospective manufacturing risk assessment and supporting process development and GMP manufacturing investigations.
- Developed Bayesian mixed-effects models (brms/Stan) to decompose CAR-T manufacturing variability into patient vs. process components across 4 critical quality attributes. Simulated out-of-specification rates across 9 process conditions—informing process lock, release specifications, and Phase 1 trial dose escalation levels.

bluebird bio — Cambridge, MA

Scientist II, Cell Therapy Process Development — Jan 2020 - Nov 2021

Promoted from Scientist (Jan 2020 - Jan 2021)

- Developed closed and automated CAR-T manufacturing processes across 3 programs: a pre-clinical allogeneic gamma delta T-cell therapy, a dual-CAR program (bbT369), and the commercially approved anti-BCMA therapy ABECMA (ide-cel).
- Designed and executed DoE studies as an individual contributor, generating analytical data via multiplexed flow cytometry (Miltenyi MACSQuant) and analyzing results via multiple linear regression to drive iterative process optimization.
- Managed a team of 3 direct reports overseeing company-wide cell material supply and led cross-functional process development in a matrixed GxP environment.

Sarepta Therapeutics — Greater Boston Area

Scientist, Manufacturing Science & Technology — May 2019 - Jan 2020

- Supported commercial GMP manufacturing of EXONDYS 51, including manufacturing deviation investigations across solid-state synthesis, chromatography purification, and tangential flow filtration.
- Built an R-based pipeline to automate HPLC chromatogram analysis for GMP chromatography runs, parsing PDF analytical reports and classifying 2,500+ peaks per batch into product vs. impurity using logistic regression (height, width, elution time). Replaced a manual review process requiring 2–4 FTEs—supporting root cause investigation of a recurring manufacturing deviation.

Northeastern University — Boston, MA

Graduate Research Assistant — Sep 2014 - Apr 2019

- Developed and validated a novel rapid prototyping method for microfluidic organ-on-chip devices, reducing fabrication time from days to hours and material costs to under $2 per chip (ACS Biomaterials 2020).
- Led a study investigating the gut-brain axis, specifically how cholinergic activation impacts TNF-α induced injury in primary human-derived intestinal epithelium (Cellular and Molecular Bioenginetic 2020).
- Authored a highly cited review on microfluidic sample preparation for single-cell analysis, evaluating techniques for tissue dissociation, cell sorting, and lysis (Analytical Chemistry 2016).

Cubist Pharmaceuticals — Lexington, MA

Process Engineer, Process Development — Jul 2013 - Aug 2014

- Developed a hollow fiber tangential flow filtration process for Ceftolozane/tazobactam (Zerbaxa) purification as a higher-throughput alternative to existing dead-end filtration.

Nantero — Woburn, MA

Process Engineer, Process Development — May 2011 - Jul 2013

- Led manufacturing process development and optimization for high-purity carbon nanotube formulations, utilizing unit operations (stirred tank reactors, TFF, chromatography) directly applicable to biopharmaceutical manufacturing.

Education

The University of Texas at Austin — Austin, TX

Master of Science, Data Science — Expected 2027

Northeastern University — Boston, MA

Doctor of Philosophy, Chemical Engineering

Northeastern University — Boston, MA

Bachelor of Science, Chemical Engineering

Patents & Publications

- **S. Hosic**, R.A. Koppes, S.K. Murthy, A.N. Koppes, J.R. Soucy. "Fluidic device and method of assembling same." *U.S. Patent 11,351,538* (Issued 2022).
- **S. Hosic**, A.J. Bindas, M.L. Puzan, et al. "Rapid prototyping of multilayer microphysiological systems." *ACS Biomaterials Science & Engineering* (2021).
- **S. Hosic**, W. Lake, E. Stas, et al. "Cholinergic activation of primary human derived intestinal epithelium does not ameliorate TNF-α induced injury." *Cellular and Molecular Bioengineering* (2020).
- J.R. Soucy, A.J. Bindas, R. Brady… **S. Hosic**, et al. "Reconfigurable microphysiological systems for modeling innervation and multi-tissue interactions." *Advanced Biosystems* (2020).
- J. Snyder, C.M. Wang… **S. Hosic**, et al. "Materials and microenvironments for engineering the intestinal epithelium." *Annals of Biomedical Engineering* (2020).
- M. Puzan, **S. Hosic**, C. Ghio, A. Koppes. "Enteric nervous system regulation of intestinal stem cell differentiation and epithelial monolayer function." *Scientific Reports* (2018).
- **S. Hosic**, S.K. Murthy, A.N. Koppes. "Microfluidic sample preparation for single cell analysis." *Analytical Chemistry* (2016).