ProteinQure

Introduction for prospective employees
We accelerate novel therapeutic development by building and sharing tools which improve the understanding of biology.

- Toronto-based startup funded by Silicon Valley & Canadian VCs/Angels
  - (Jul 2019) raised seed round
- 15 employees as of Oct 2020
- 3 Current commercial drug discovery projects (including a collaboration with AstraZeneca)
  - We don’t sell software, we work in partnerships on real drug discovery. Our computer designed molecules go to the lab.
Protein therapeutics are a $200B market growing at 12% but most of the 3,000 annual projects fail. Because of the 90% failure rate, one new protein therapeutic can require R&D investments upwards of $1B.

**Industry Success Rate**
- Lead Discovery: 75%
- Lead Opt: 85%
- PreClinical (3471 assets in 2018): 69%
- Ph I: 54%
- Ph II: 34%
- Ph III: 70%

**Industry timeline**
- 1.5 Yrs
- 2 Yrs
- 2 Yrs
- 1 Yr
- 2 Yr
- 2 Yr

**ProteinQure current offering**

Because of the 90% failure rate, one new protein therapeutic can require R&D investments upwards of $1B.
ProteinQure is a leader in computational protein design

We are one of 12 healthcare companies in the Top 100 AI by CB Insights

This is why we have multiple partnerships with large pharma
Why join us?

**Team.** Our team is a diverse interdisciplinary and collaborative group. We have published in top journals, worked for the best enterprise companies in the world and have helped organized some of the largest open source software conferences.

**Challenge.** We are innovating in science, software engineering and business models. We work in one of the most competitive industries and with the most advanced technologies. If you love problem solving and learning this is the place for you. You will learn how to build cutting edge tech, work with senior groups from global companies and operate high performance scientific teams.

**Impact.** The next technological revolutions in biotechnology will potentially be some of the largest boons to human health that we have ever seen. We are not just trying to design life saving drugs, we are helping grow our understanding of biology along the way.
We aspire to be the best protein design company in the world, these are our core beliefs

**Structure and physics-based methods**

Eventually, most objects in the world are going to be instantiations of computer code. Autonomous vehicles will be code made physical (as transport), entertainment will be code made sensory.

Biologics won’t be different. Proteins are small machines that obey the rules of physics. A protein’s sequence (and environment) determine its structure. That 3D structure determines the function. Medicines will be polymers that are instantiations of code made physical (as biological ‘machines’). A key approach will be the diversity of computational tools, varying methods and ensembling them. Starting as a funnel or pipeline (from low resolution to higher resolution more expensive methods), but eventually alternating between them.

**Machine learning to represent proteins**

Humans are powerful storytellers. It is our ability to label and build narrative that sets us apart as a species. We use those labels to learn relationships and communicate with each other. But English is a poor way to answer what a protein is. Alpha helix, beta sheet, disordered are all terms that we create to help order a messy world. But biologics don’t conform to neat labels. Instead, we have objects that are defined by 3D coordinates of atoms and distributions over dynamics. There is little doubt that accurately articulating ‘what a protein is’ requires a language beyond human comfort. So we have to build computers which can learn accurate representations of these proteins.

Graphs, PDBs, structural features and embeddings all need to be part of our tool kit.

**Wetlabs reimagined**

Experiments are critical to deciphering biology and driving new insights.

The experiments of tomorrow will combine the strengths of human intuition with machine intelligence to uncover insights into complex biological systems.

Multiplexed assays that a human mind could never deconvolute, tradeoffs in speed/throughput of experiments designed for computational models and measurements which are only interpretable by machines will all need to be invented along the way.
Company Values

Transparency: We encourage open and honest communication between all levels of the company. This includes sharing information on projects, goals, business objectives and across cross-functional teams. Stick up for your own opinions and don’t hold back just because you aren’t the most senior person in the room.

Commitment to improvement: At ProteinQure we are creating novel technology, you can’t be afraid to fail. ProteinQure routinely sets goals that others would find crazy. Our commitment to each other and a job well done stands out both internally and to our partners. So we don’t believe in setting low bars or settling for sub-optimal approaches. We focus on iteration and improvement as we work.

Learning and growth mindset: Results are meaningless without understanding. We aim to understand the how and why, not just get lucky with the answer. We reward good processes and persistence; not just results. We also embrace feedback. People are expected to ask for feedback and more importantly do the hard work of giving it! We also don’t just stay in our lane. ProteinQure employees are marked by an intellectual curiosity for topics beyond just their domain.

Diversity and Collaboration: ProteinQure is at its strongest when we combine our diverse technical skills, intellectual passions and experiences. Collaboration across diversity of all forms is foundational to how we operate and embedded in our hiring. We have a workplace where our differences enhance our work.

\(^1\)This is not an exhaustive list of our values, but what distinguishes ProteinQure is the emphasis we place on the above.
A unique team

Mark, Head of R&D
Aron, Computational Scientist
Glenn, Computational Scientist
Ozge, Computational Scientist
Lucas, CEO
Chris, CSO
Tomáš, CTO
Francine, Wetlab Scientist
Tracy, Wetlab Scientist
Eugene, Infrastructure Engineer
Tomiwa, Software Eng
Naman, Business Operations
Sean, Software Engineer
Sid, Machine Learning Scientist
Hamidreza, Machine Learning Scientist
Glenn, Computational Scientist
Ozge, Computational Scientist
Eugene, Infrastructure Engineer
ProteinQure builds on breakthroughs in computational tools

Biophysical Simulations and Integrative Modeling
- Enhanced-sampling for protein structure/dynamics
- Protein-protein docking
- Protein design

Machine Learning with Protein Sequence/Structure data
- Enhanced definitions of structural diversity
- Rapid property prediction and integration of multiple tools

Next-Generation Computing Platform
- Cloud computation at scale including proprietary orchestration tools
- Ready to leverage quantum computation

HARDWARE PARTNERS
- Rigetti
- IBM
- D-Wave
- Fujitsu
- Amazon Web Services
- Microsoft
ProteinQure’s unique protein design platform

Building Blocks

- OS Rosetta
- OS MD Simulations
- OS Cloud Computing
- OS Quantum Algorithms
- Machine Learning
- Experimental Data (from partners as well)
- Multi-property optimization
- Scoring Functions

Outputs

- Simulation results (Structural models of drug/receptor complexes, binding site characterization)
- Protein Therapeutics (Libraries or multi-property optimized binders)

Key Advantages of PQ platform
- Target-specific protein design
- Novel protein/peptide scaffolds
- Low data requirements
- Multi-property optimization

PQ has built on open source/licensed tools

ProteinQure proprietary tool
How we work
Some of the current (Q2 2020) processes:

- Weekly lunch and learns (sometimes external) involving all groups
- Agile for all teams (biology and tech) using Gitlab
- Quarterly OKRs (type of goal setting) for both teams and the company
- Collaborative (scientists, engineers, business) efforts on projects

Note we have a new office as of Sept 2019
Toronto is great!

World-class location for talent, resources, and fun!

Thriving healthcare, software, and deep tech ecosystem; a competitive advantage for companies like ours who are some of the first to establish themselves in Toronto.

Canada is an extremely diverse and welcoming culture.

Facts:

- Created the most tech jobs of any North American city in 2018
- 4th Largest City in North America
- Top 10 most liveable city in the world!
- Professional Soccer, Hockey, Baseball, Basketball, Ultimate Frisbee teams
- Thriving cultural scene (International Film Festival, Food, Theatre, Museums)
ProteinQure

Designing a healthier tomorrow
Hiring Process (This may differ for certain roles)

While the process isn't always the same for every role we try to keep it relatively consistent.

1. Introductory Call (~30 min). We want to get to know you, understand your motivations and understand your skills. This is a chance for you to ask questions about us also!
2. Phone Interview (60-90 min). This is a more detailed dive to make sure you have the requisite skills for the position. Usually split in half with two PQ employees. If you are local and prefer to visit office we welcome that!
3. On-site interview (~3 hours). You will meet with multiple people on the team. That includes at varying levels and functions. Our primary focus is for you to meet the broader team and understand if there is a mutual fit. On the technical side this may include a work assignment or homework as well. We cover travel and accommodation costs if necessary.
Benefits

- Work flexibility. We are pretty good at accommodating your preferred working styles. We rely on you to decide what is necessary to get the work done. That includes taking as much vacation as you want.
- Conferences and learning perks. We support all of our employees efforts to learn and improve. Most employees participate in at least one conference of their choice.
- Health spending accounts and benefits that are in the top 20% of all Toronto startups.
Advisors that have done it before

Scientific Advisory Board

**VP Chemistry, Morphic**
Morphic therapeutics (Raised 240M+)
uses computational tools to do
structure based design and Blaise was
employee #2

**Previous:**
- Director Chemistry Sanofi
- VP Chemistry Icagen

**CEO, Atomwise**
Atomwise is an AI platform for
computational drug discovery of small
molecules and has raised $50M+

**Marcel Patek**

**Abraham Heifets**

**Philip Kim**
Professor at U of Toronto
(leads a research lab)
Combining display technologies and
computational methods for drug discovery