

## **TORY M. SCHAAF, PH.D.**

Minneapolis, Minnesota

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## **EDUCATION**

### **Ph.D., Biochemistry, Molecular Biology & Biophysics**

University of Minnesota

September 2012 – January 2017

Developed high-throughput FRET-based biosensor platforms for drug discovery.

Inventor on U.S. Patent Application 62450188 (2017).

Collaborated with University of Minnesota Office of Technology Commercialization (OTC).

### **B.S., Dual Major: Neuroscience & Biochemistry**

Minor: Psychology

University of Minnesota, 2009

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## **EXECUTIVE PROFILE**

Translational scientist, clinical research director, assay development leader, and AI-enabled technology architect with 15+ years of experience across:

- Diagnostic assay development
- High-throughput drug discovery screening
- Molecular biosensor engineering
- Clinical trial leadership (VA & multi-site hospital systems)
- NIH & state grant funding
- University-level teaching & curriculum design
- AI-integrated dashboard and education systems

Inventor on patented high-precision FRET assay platform.

Contributor and primary writer on NIH R01, SBIR, STTR, K12, and state-funded research programs (~\$1M+ funding impact).

Known for bridging molecular science, engineering systems, clinical compliance, and emerging AI-based infrastructure.

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## **PROFESSIONAL EXPERIENCE**

### **Senior Development Scientist**

Beckman Coulter Diagnostics — Chaska, MN

July 2022 – November 2025

- Led development and optimization of blood-based diagnostic assays
- Designed DOE experiments and validation workflows
- Partnered cross-functionally with engineering, firmware, software, QA, regulatory
- Executed FDA QSR-aligned documentation
- Mentored scientists and improved lab process flow

Position concluded due to corporate reduction in force (not performance-related).

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### **Clinical Research Director**

Minneapolis VA Health Care System | University of Minnesota | CentraCare

2020 – 2023

Worked under Dr. Uzma Samadani, MD, Ph.D. (Founder, Oculogica).

Directed five clinical research programs including:

- Traumatic brain injury biomarker validation
- AI-assisted CT scan detection research
- Epidural spinal cord stimulation trials
- Neuromodulation device clinical trials
- Neurotrauma biomarker research

Responsibilities:

- Primary IRB and VA regulatory oversight
- FDA and hospital compliance coordination

- Clinical trial auditing and documentation
- Budget management and grant writing
- Cross-collaboration with UMN informatics faculty (Dr. Rui Kuang; Dr. Yuk-Cham Yuk)
- Authored/co-authored peer-reviewed publications

Secured and contributed to Minnesota state TBI funding (~\$1M total across awards).

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### **NIH K12 Postdoctoral Fellow (Preparing Future Faculty)**

University of Minnesota

2017 – 2020

NIH K12 / IRACDA Fellow

NIH T32 Minnesota Muscle Fellowship

- Engineered fluorescent biosensors
  - Developed HTS screening pipelines
  - Built quantitative imaging analytics workflows (Python, Matlab)
  - Co-authored NIH R01, SBIR, STTR proposals
  - Earned Preparing Future Faculty Certificate
  - Received mentorship training for community college instruction
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### **Screening Operations & Translational Scientist**

Photonic Pharma

2017 – May 2020

- Managed pharmaceutical screening subcontracts (including Bristol-Myers Squibb)
  - Integrated biosensor platforms into HTS pipelines
  - Authored grant documentation and technical reports
  - Contributed to licensing efforts related to patented FRET technology
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## **Scientist / Engineering Consultant**

Fluorescence Innovations

2014 – 2017

- Contributed to ultrafast fluorescence lifetime instrumentation
  - Assisted assay translation and precision measurement optimization
  - Supported STTR documentation and grant proposals
  - Work overlapped with Ph.D. research under OTC coordination
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## **Research Associate**

R&D Systems (Bio-Techne)

2011 – January 2013

- Large-scale mammalian cell culture
  - Stable clone development
  - Flow cytometry and protein validation
  - Developed SOP and Manufacturing protocols for new cDNA product VersaClone.
  - Developed mono and poly clonal antibody interacting with all departments across BioTechne.
  - CEO Tom Oland created a 20 hour week salary position when I entered grad school to retain me part time. It was a side project molecular biology training in grad school
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## **Junior Scientist**

Lillehei Heart Institute — University of Minnesota

2009 – 2011

- Gene therapy research
- Lentiviral engineering
- FACS-based cell sorting
- Managed SPF animal colony (~1,500 animals)

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## UNIVERSITY TEACHING EXPERIENCE

North Hennepin Community College

Normandale Community College

Saint Paul College

Augsburg University

University of St. Thomas (Biochemistry; resigned February 2026 due to conflict-of-interest considerations)

Courses taught (virtual & in-person):

- General Biology (lab)
- Human Biology (lab)
- General Chemistry (lab)
- Biochemistry (lab; Augsburg Fall 2022)
- Molecular Biology (Augsburg)
- Evolution (virtual)
- Sex & Human Diversity
- Ethics

COVID-era curriculum design included:

- Kaltura lecture systems
- Moodle / D2L integration
- LaTeX equation design
- MATLAB demonstrations
- PyMOL structural modeling
- Virtual laboratory simulations
- Synchronous and asynchronous instruction

Designed full curricula, exams, lab manuals, grading rubrics.

Implemented active learning and inclusive pedagogy.

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## **PATENT**

Schaaf, T.M. et al.

High-Precision FRET Assays

U.S. Patent Application 62450188 (2017)

Licensed to Bristol-Myers Squibb

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## **PUBLICATIONS**

Author on 15+ peer-reviewed publications including:

- Science Signaling
- Frontiers in Neurology
- Frontiers in Surgery
- Neurosurgery
- Cells
- Scientific Reports
- SLAS Discovery
- Biosensors

Graduate and postdoctoral publications focused on:

- FRET-based high-throughput screening
- Receptor conformational dynamics
- Cardiac calcium transport mechanisms
- Neurotrauma clinical outcomes

Full publication list available upon request.

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## **GRANTS & AWARDS**

- Minnesota State TBI Grants (~\$1M across awards)
- NIH K12 Preparing Future Faculty Fellowship
- NIH T32 Minnesota Muscle Fellowship

- NIH Chemistry–Biology Interface Training Grant
  - 3M Graduate Fellowship (competitive stipend award)
  - Arnold H. Johnson Graduate Fellowship
  - Ross A. Gortner Award
  - Charles Carr / William Peterson Award
  - Undergraduate Research Opportunities Program (UROP)
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## **TECHNICAL SKILLS**

### Molecular & Cellular Biology

Cloning, CRISPR, mutagenesis, PCR, Western blotting, mammalian cell culture

### Biosensors & Imaging

FRET, fluorescence lifetime imaging, live-cell microscopy, high-content screening

### Clinical & Regulatory

IRB compliance, VA research oversight, FDA QSR alignment

### Data & Analytics

Python, Matlab, Excel, GraphPad Prism, DOE

### AI & Platform Development (2025–Present)

WordPress architecture, PHP, REST APIs, JSON dashboards, AI-integrated workflows, accessibility-focused UI systems, interactive timelines, dynamic data visualization, educational simulation tools

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## **TECHNOLOGY ARCHITECTURE (DrTory.com)**

Founder and architect of AI-integrated educational and dashboard systems including:

- Interactive timeline engines
- Research dashboard interfaces
- Accessibility-focused learning modules
- AI-enhanced curriculum tools
- Case documentation builders

- Secure server-side AI endpoints
- Dynamic animation and UI rendering

This work represents a transition into scientific technology architecture, merging regulated research expertise with modern AI-enabled digital systems.

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## **PROFESSIONAL MEMBERSHIPS**

Biophysical Society

American Physiological Society

American Society for Cell Biology