



# BIOPSY: Biochemical Programming System

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# BIOPSY: Biochemical Programming System

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## Societal Impacts

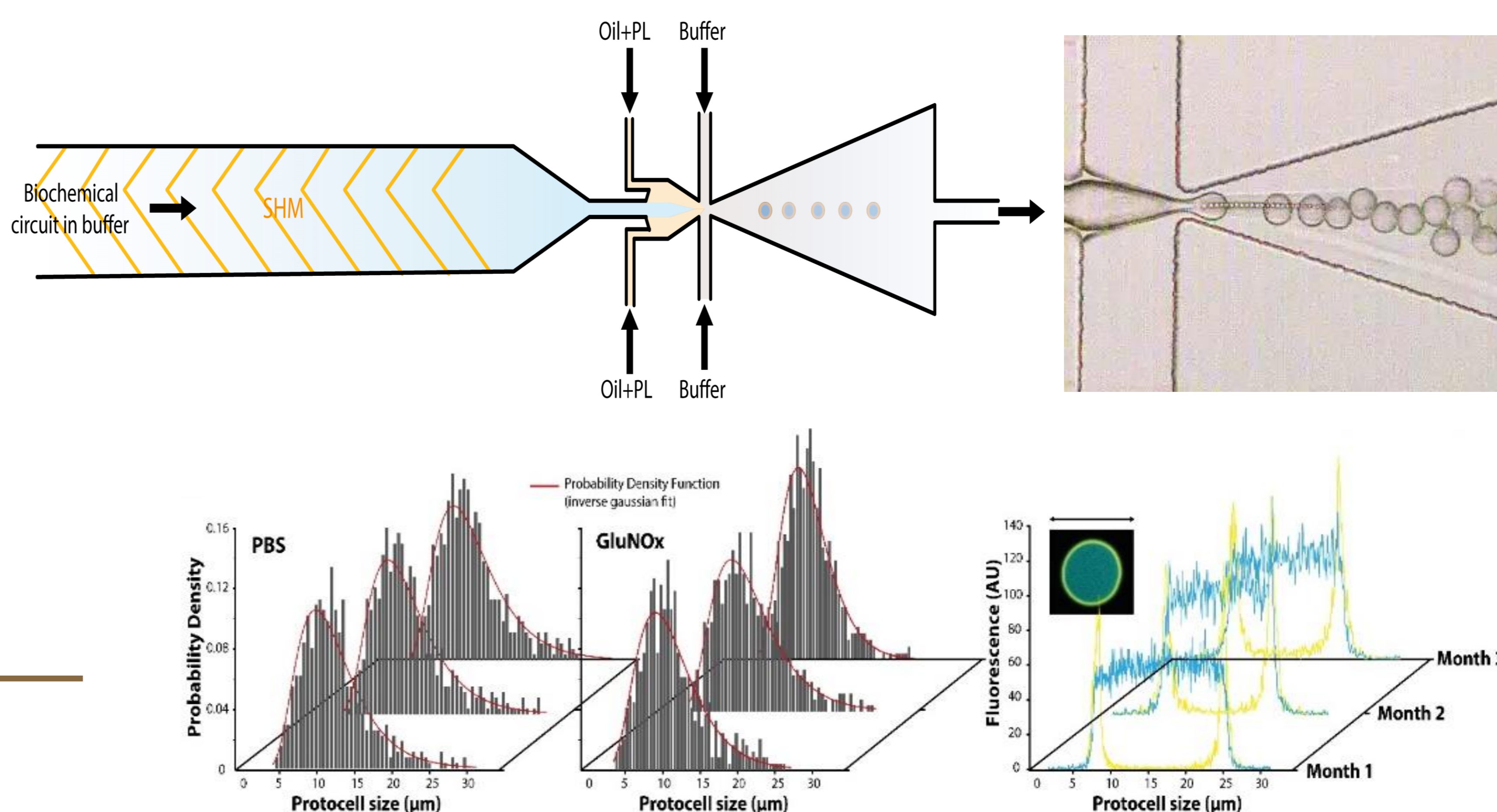
- Paradigm change in medical practice: personalized medicine and “theranostics”
- Convergence of diagnosis and therapy: new role of biomarkers
- Synthetic biology provides new opportunities

## Technological Challenges

- Reliability of synthetic biological biosensor systems in clinical context
- Unconventionality of biochemical computation: stochastic, continuous-time, poorly insulated in compartments, and created by evolution
- Automation of biochemical system design: asynchronous approach, signal integrity and modularity in the presence of undesirable global interference, reusing molecular species

## Project Objectives & Methods

- Master complexity of biochemical computation and biochemical programming on four fronts:
  1. Compiling behavior specifications to biochemical reactions
  2. Using chemical reaction networks (CRNs) as programming language
  3. Biochemical biosensor program implementation in microfluidic reactors
  4. Formal methods for biochemical system design



## Protosensor CRN Design Flow

