sysmex
Lighting the way with diagnostics

Internship Presentation

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Presented 4th July 2019, Sysmex Technopark

About me – Brief Introduction

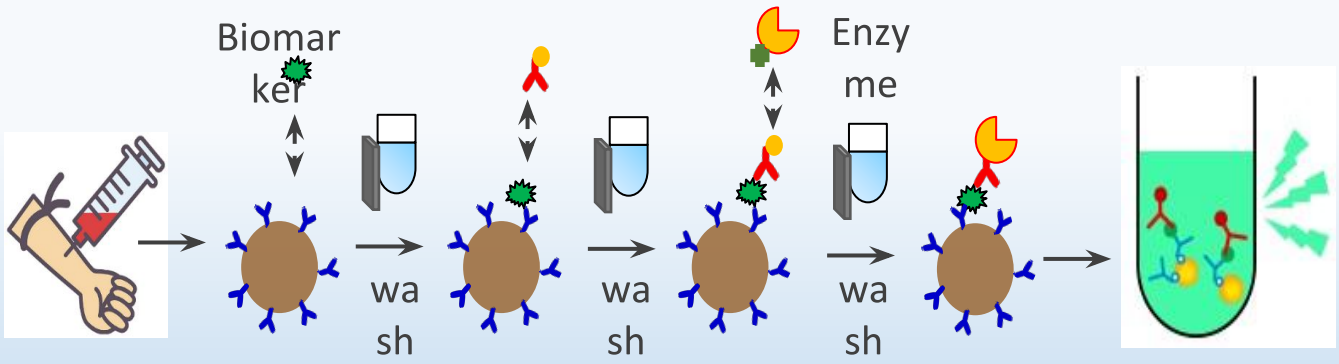
- Student at Indian Institute of Technology Bombay (IIT Bombay)
- Stay in Mumbai City (Bombay), the most populous city in India
- Majoring in Electrical Engineering
- Masters specialization is Signal processing
  - Information Theory, Statistics, Image Analysis, Machine Learning
- Minor Program in Computer Science
- Completed 3 out of 5 years of my Combined Bachelors and Masters program

Motivation for applying to program

- Learn more about Healthcare Device Technology and the Industry
- Expected growth in Healthcare device market in the coming decades makes Sysmex a promising career option
- Inspired and fascinated by Japan’s technological advancements
- Enjoyed previous visit to Hiroshima University in June 2018
- Positive reviews by senior students from my University

Background about Project

- Worked with RnD Division in Central Research Laboratories (CRL)
- Project was based on a novel Immunoassay technology
- Immunoassay Detect and measure specific proteins
- New methodology has the potential to improve over existing methods like HISCL



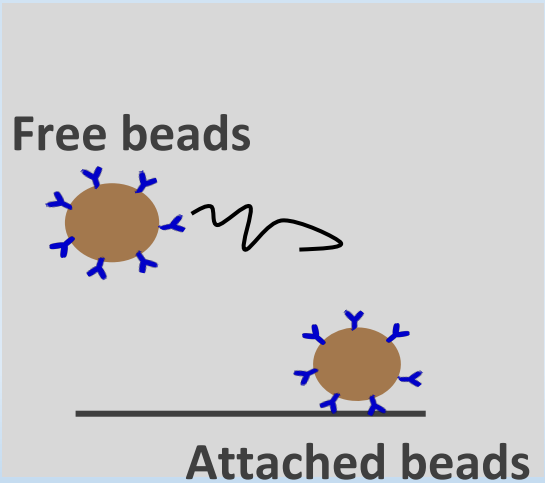
Numerous steps in Traditional Immunoassay

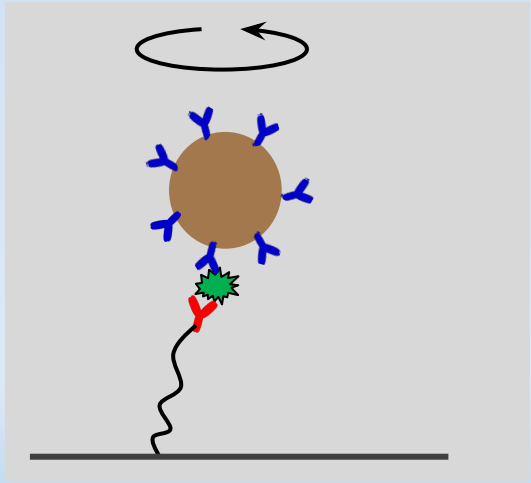
Sysmex HISCL product

Background about Project

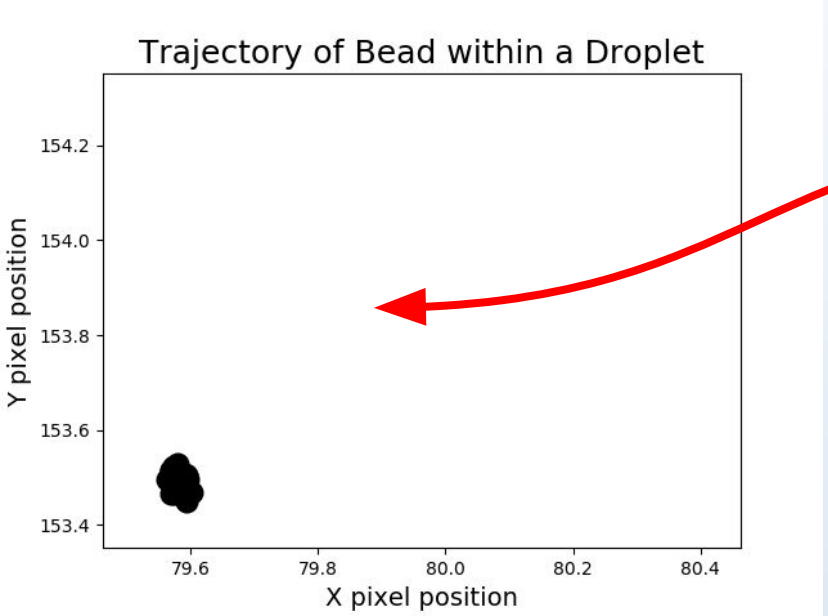
- This project Promises a Simpler Immunoassay
- Uses the procedure
  1. Induce biomarker reaction
  2. Observe reacted beads under Bright Field Microscopy
  3. Analyse their trajectory
  4. Classify them as either target negative or positive

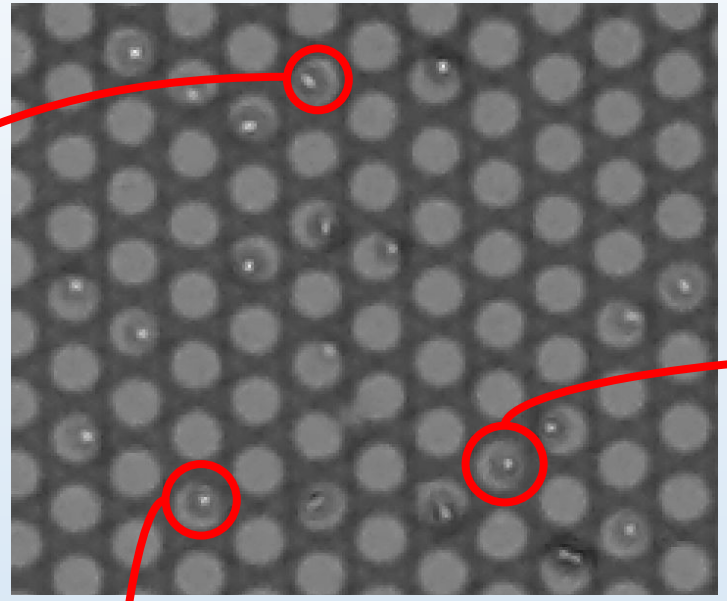
Target negative beads can be either freely moving or attached

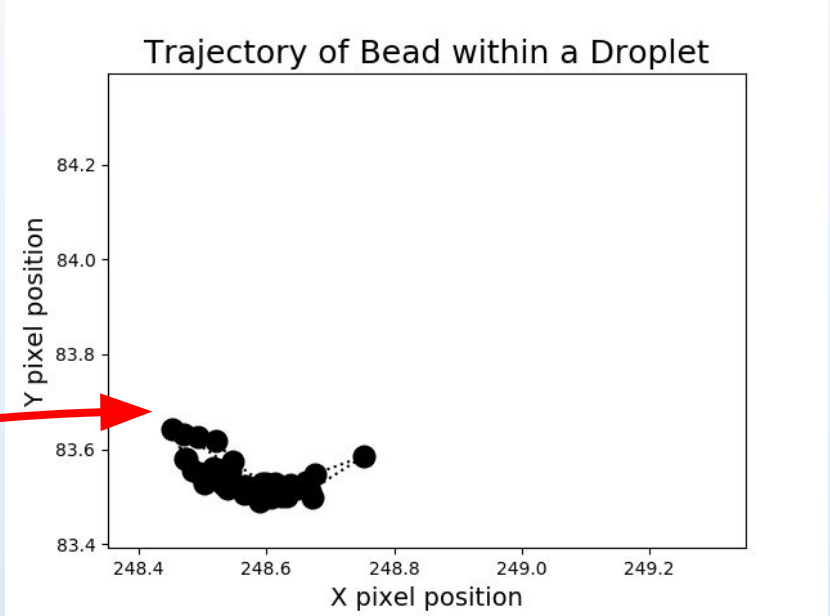


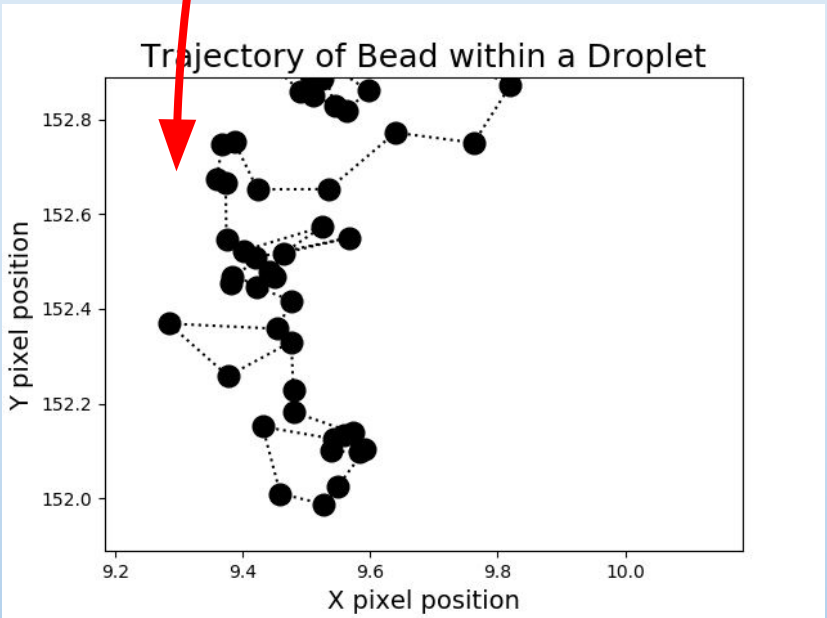


Target biomarker sandwiched between Tether and Bead







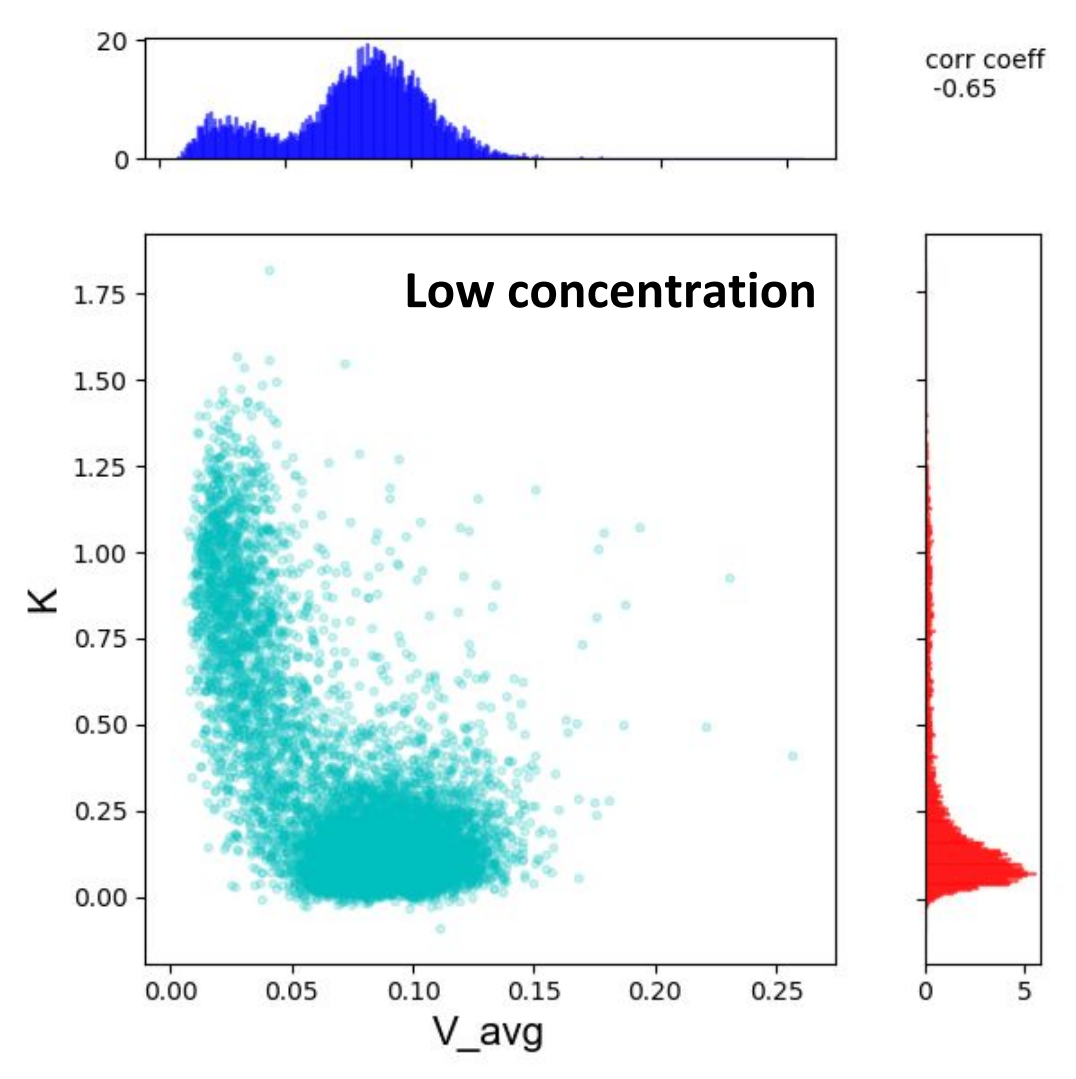


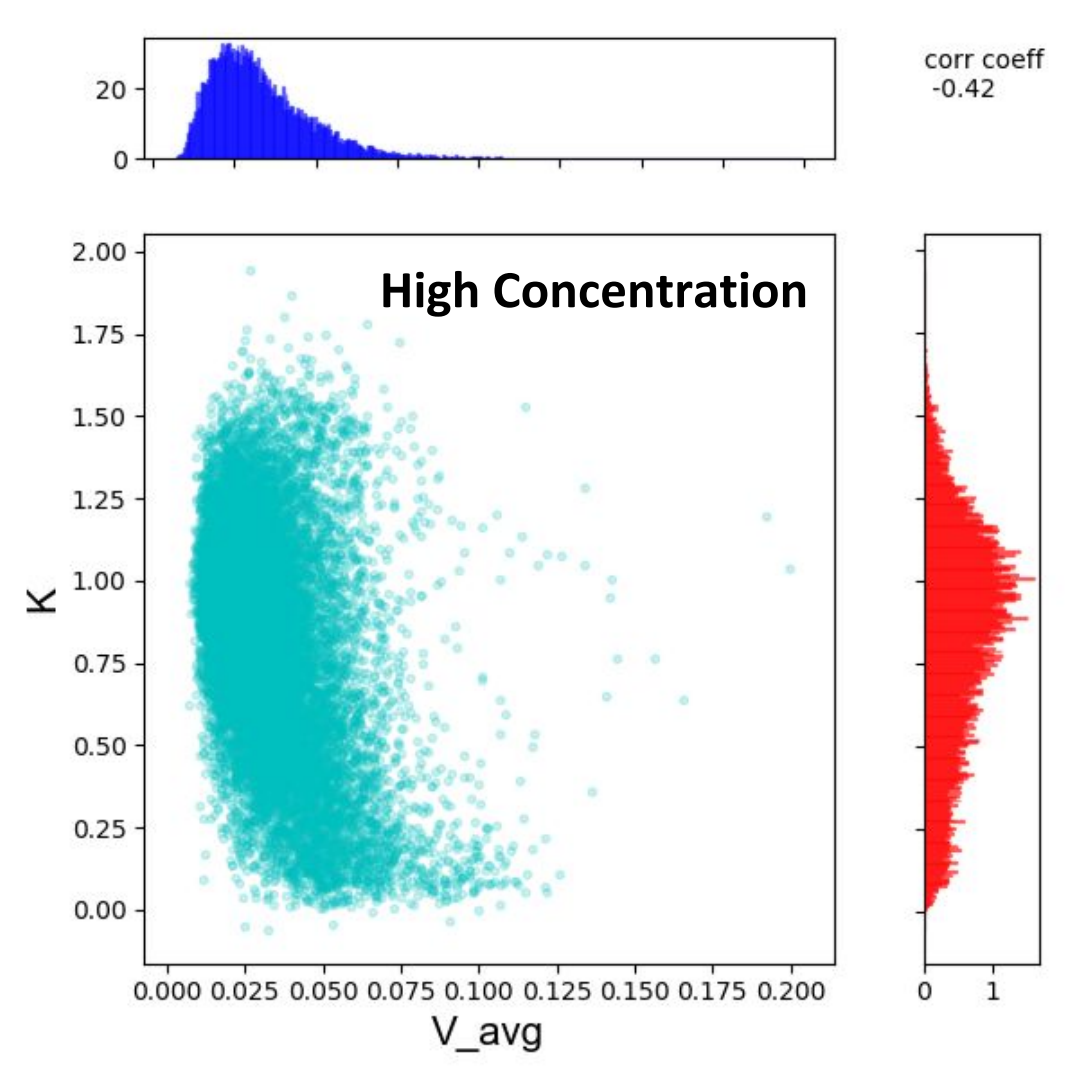
Example trajectories
Top Left: Adsorbed bead
Top Right: Target positive beads
Bottom: Freely moving bead

Work Responsibilities and Contribution

- Obtained parameters by analysing the motion of beads
  - Parameter example: Average Speed
- Reduced processing time for parameter computation
  - From 30 min to 2 min
- Automated classification procedure
- Improved classification performance using multiple parameters
- Suggested changes to dataset to increase model consistency

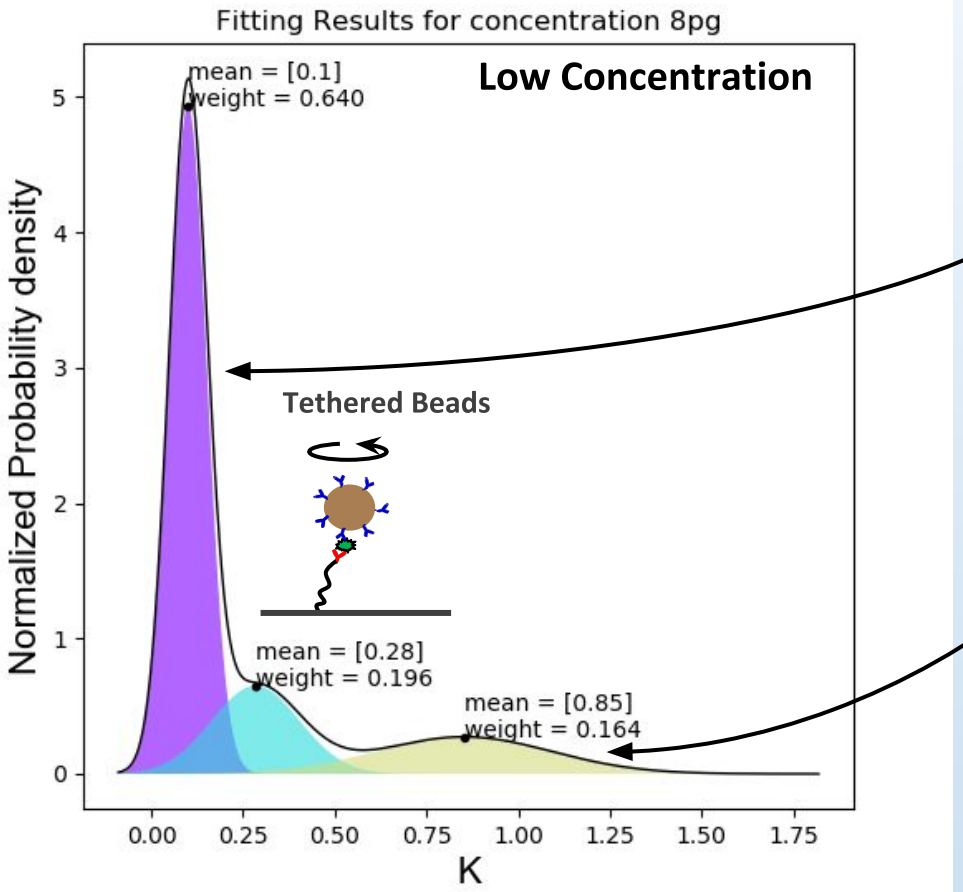
Parameter Visualization

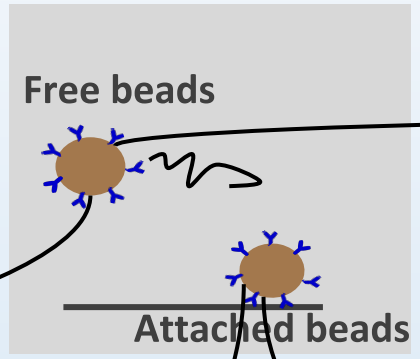


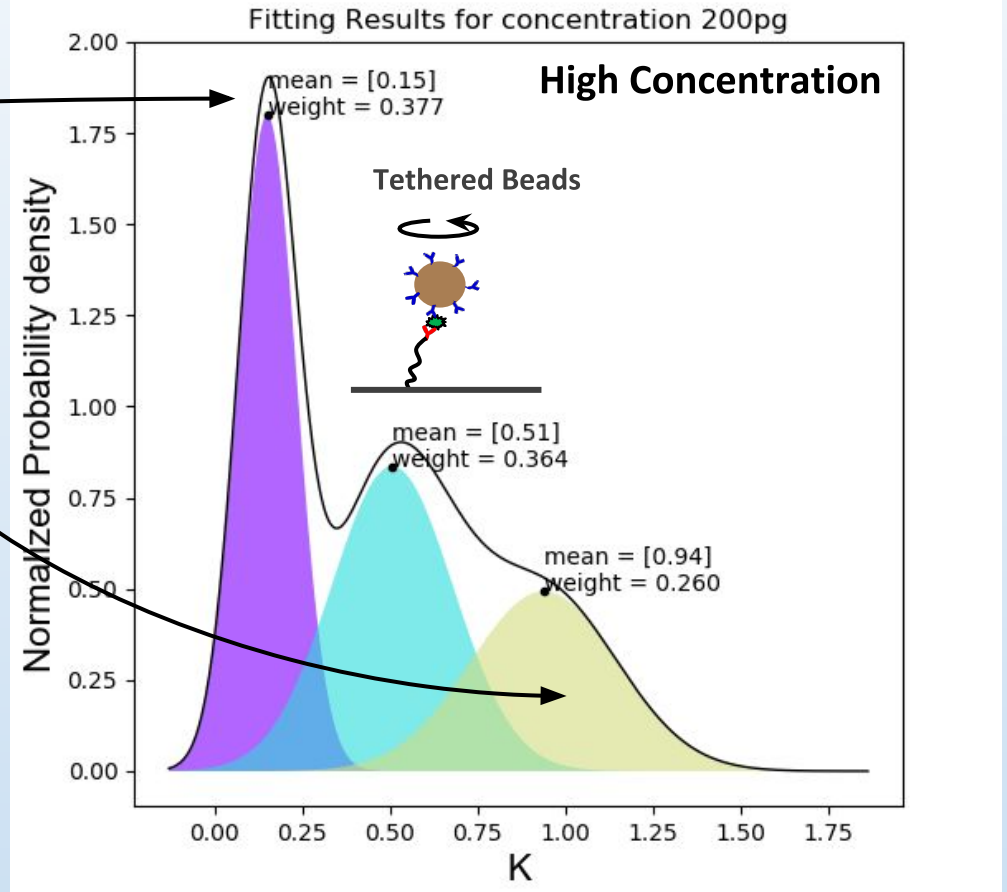


Change in distribution of beads with concentration

Analysis Results







Learning parameter range for Target Positive Beads

Working at Sysmex

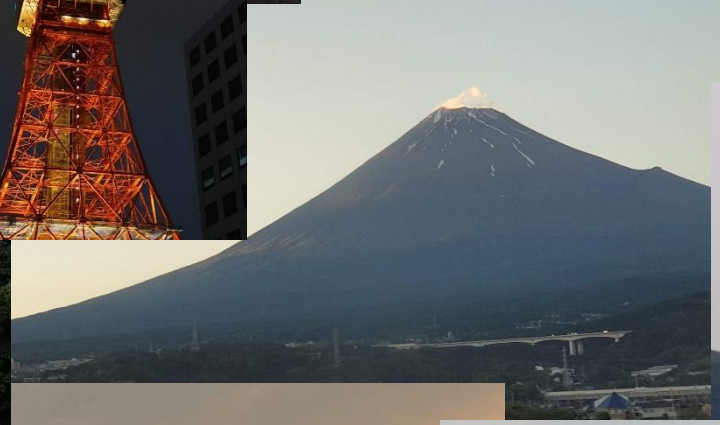
- Great infrastructure even outside of laboratories
- Open Office culture promotes discussions
- Can get questions resolved without emails or meetings
- A lot of private workspaces around the office
- Weekly Group meetings offer course-correction and valuable inputs

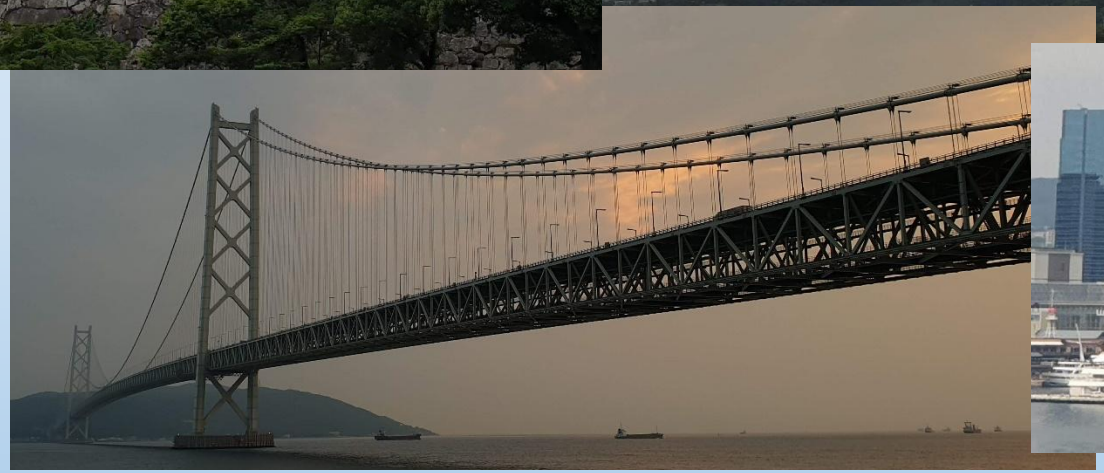
Discussion during weekly meeting

Thoughts on Living in Japan

- Cleanliness in Cities and Countryside
- Great Public Infrastructure
- Kindness towards strangers
- Language barrier limits interaction for foreigners
- Public transportation network
  - Fast, Punctual, Convenient
- Makes travelling around comfortable and enjoyable

Travelling around





Shrines and Markets

Food in Japan

Thank you for your attention