
High-Throughput Surface Plasmon Resonance Spectroscopy
BioPOEMS Research Group
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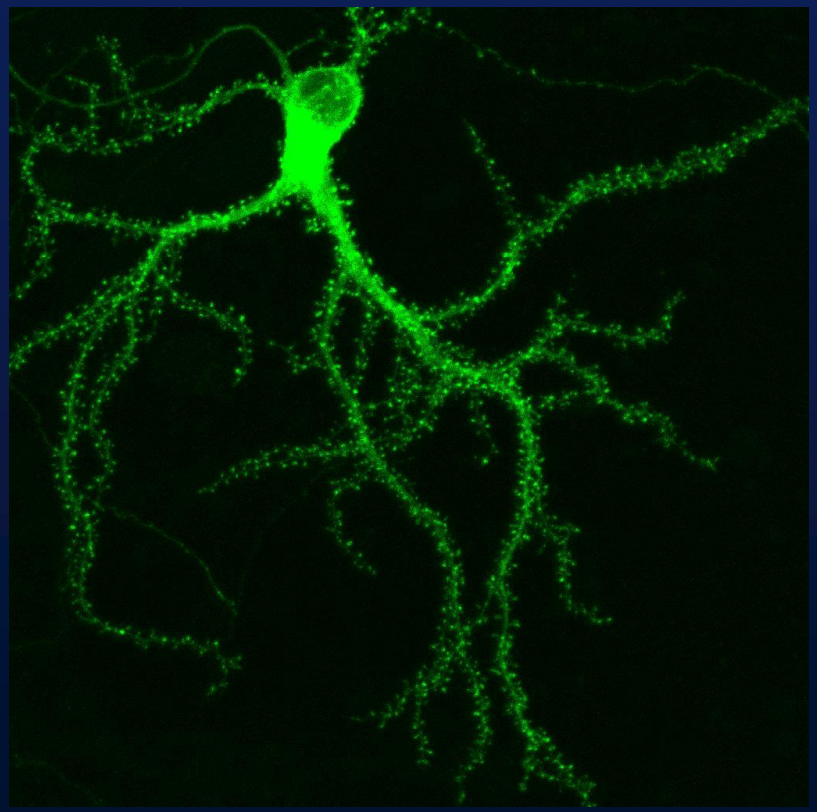
Why is SPR Spectroscopy Important?

- Imaging
- Sensors
- Applications
  - Protein Expression
  - Clinical Immunoassays
  - Proteomics
- Common techniques have downsides
- SPR is label-free



Source: Paul de Konick, Universite Laval

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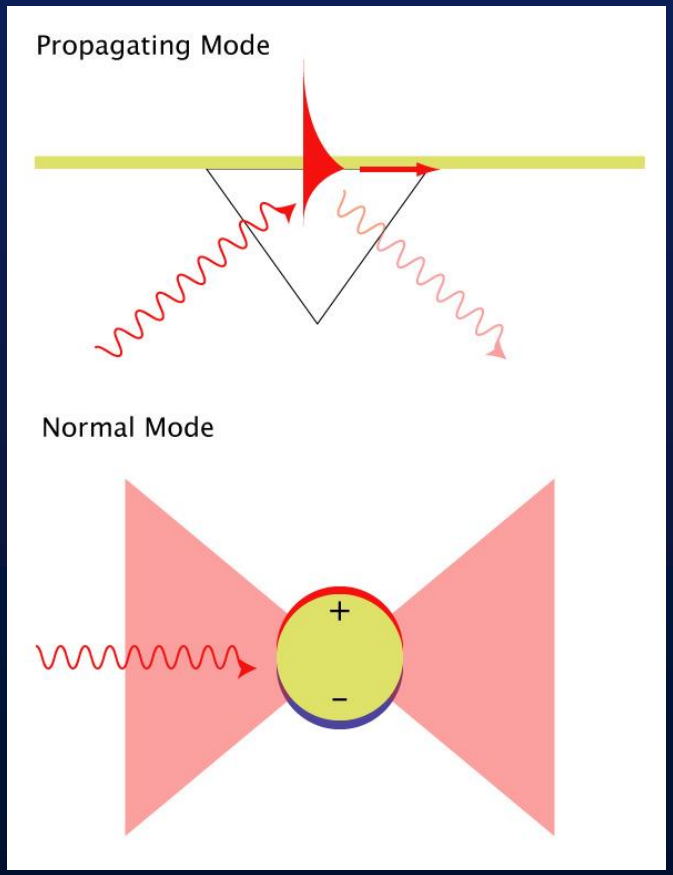
What is Surface Plasmon Resonance?

- **Longitudinal electron wave**
- **Surface phenomenon**
- **Not a quantum effect**
- **Propagating vs normal modes**
- **Elastic scattering**
- **Tunable**
- **Measurement techniques**



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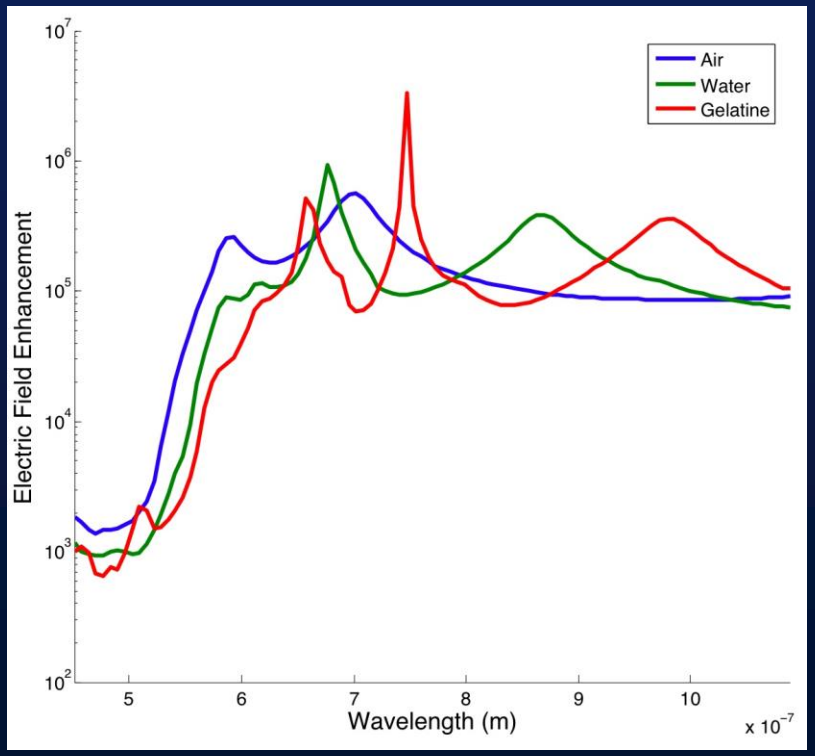
Examples of SPR



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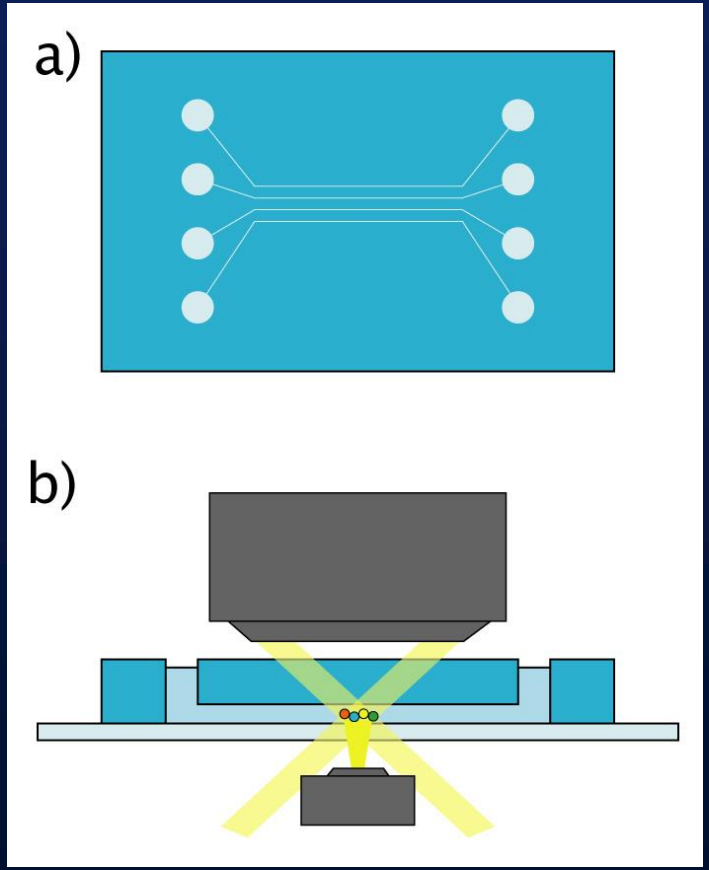
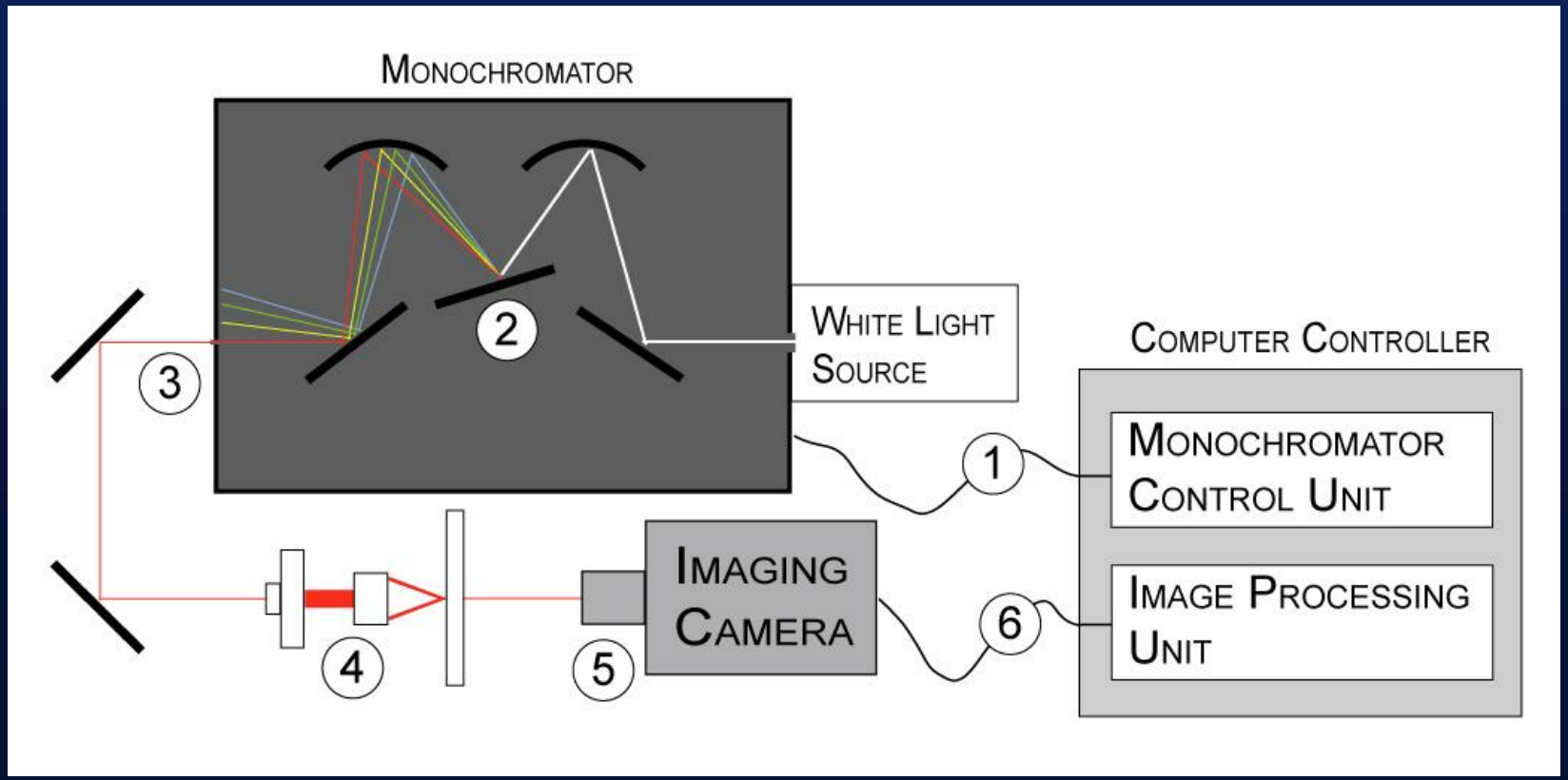
Benefits of SPR Spectroscopy

- Simple chemistry
- Real-time analysis
- Quantitative data
- Integration with microfluidics
- Measurement
  - Dark-field microscopy vs traditional spectroscopy



Experimental Setup



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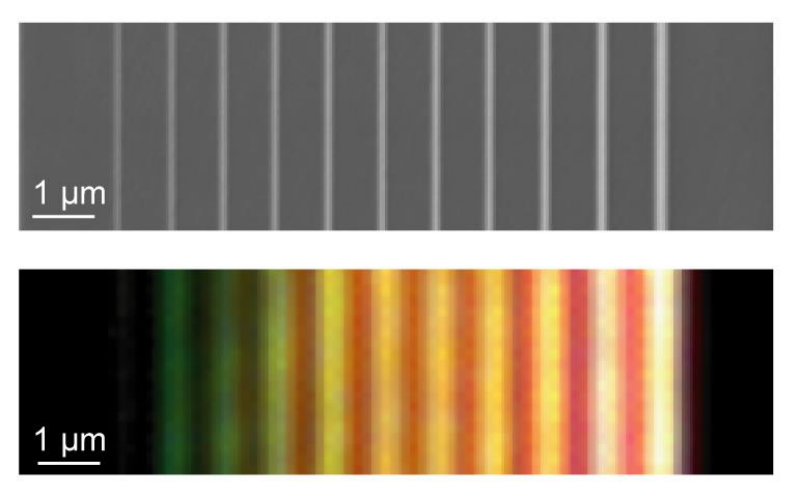
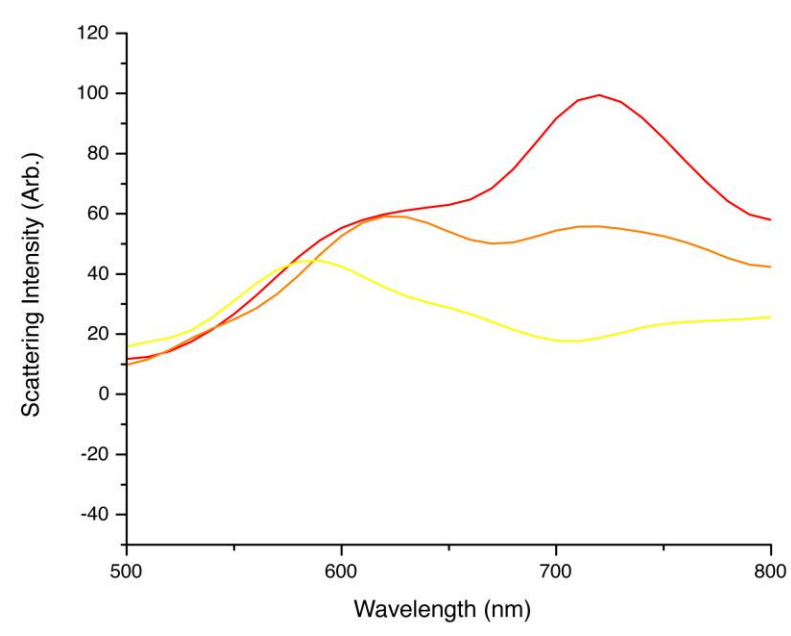
Nanowire Results





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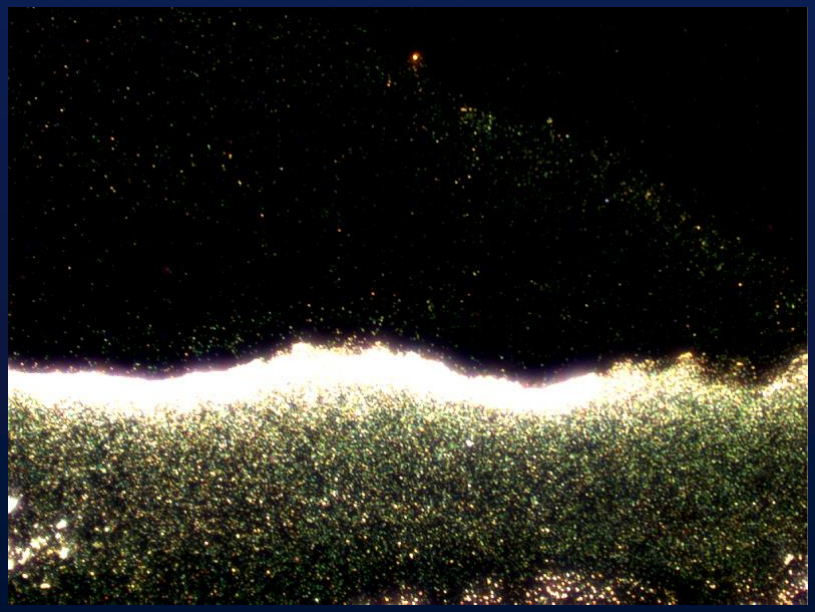
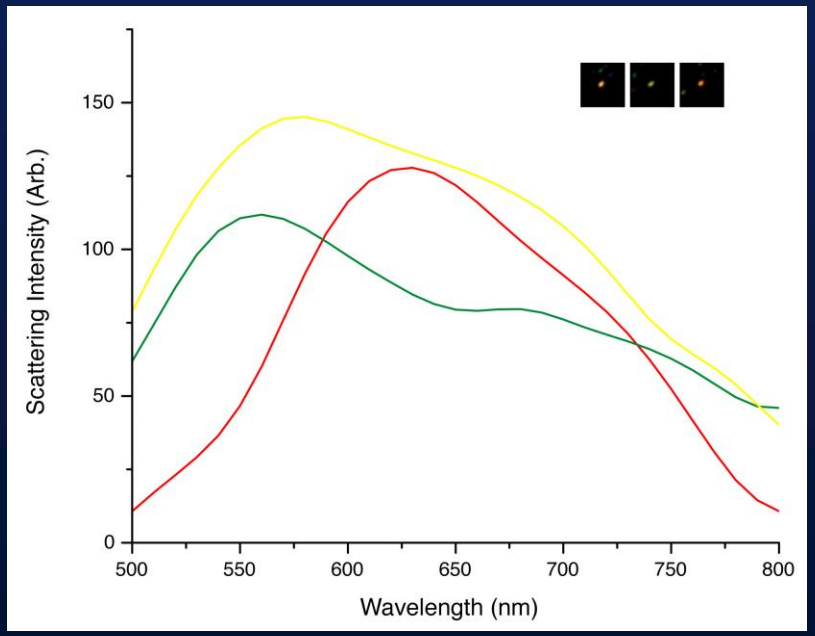
Nanoparticle Results





Conclusion and Future Work

- Demonstrated a new imaging technique
  - Multispectral
  - High-throughput
  - Simple system components
  - Compatible with low cost gold and silver nanoparticles
  - Real-time analysis
- What are we doing with it?
  - Gold nanoparticles of different sizes as bar-codes
  - Functionalize with antibodies
  - Flow into microfluidic channels
  - Detect multiple antigens simultaneous and obtain quantiative data

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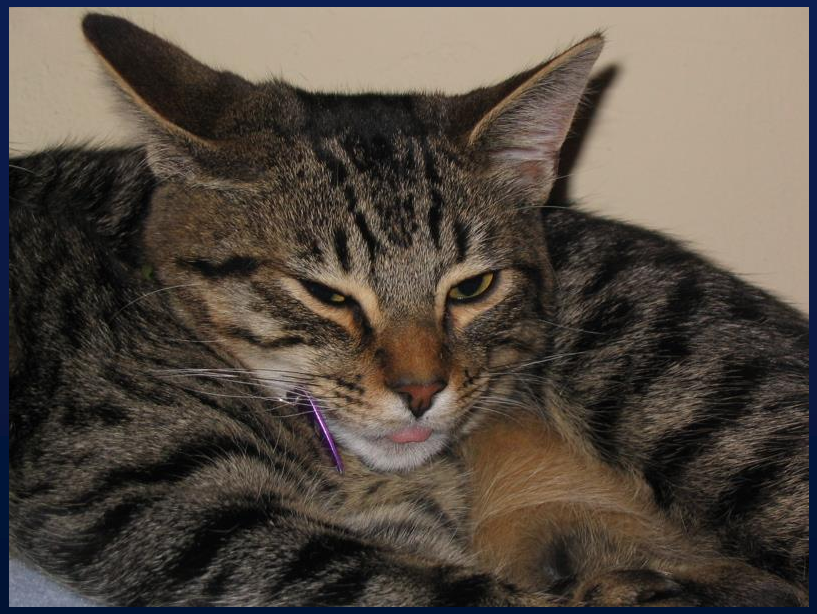
Thanks

- Caroline Kane
- Gang Liu, Jaeyoun Kim and Luke Lee
- Cassie
- Family
- Bert and Sherlock



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