

Addressing Opportunities in Health Care via Protein Calorimetry

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- Why?
- How?



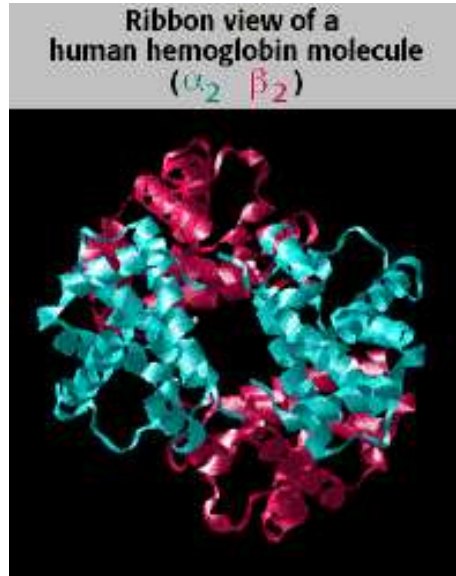
The business opportunity

Components of Product Offering



From Burstein Technologies' web site.

Why proteomics? Why calorimetry?



- Too late for HP to enter genomic instrumentation race; proteomics (and other -omics) still offer opportunity.
- 3D folding is the hallmark of proteins; denaturing via heat is a way to study it.
- Commercial microcalorimetry systems are already routinely used in drug discovery applications.
- Ultimate detection sensitivity not obtainable via calorimetry but it is a “label-free” technique.
- Calorimetry offers an opportunity to leverage ASD strengths in MEMS, testing and modelling.

What is Calorimetry?

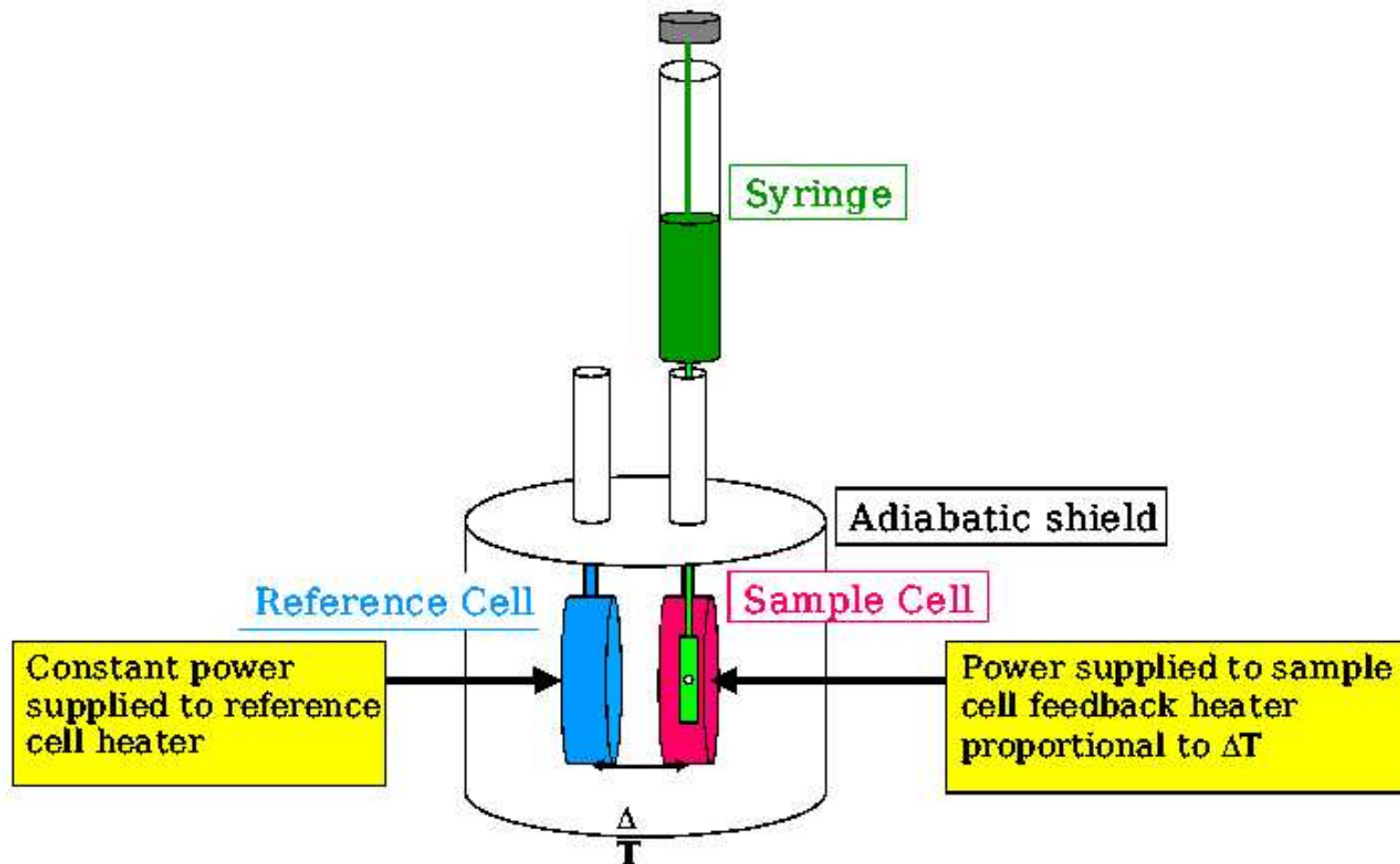
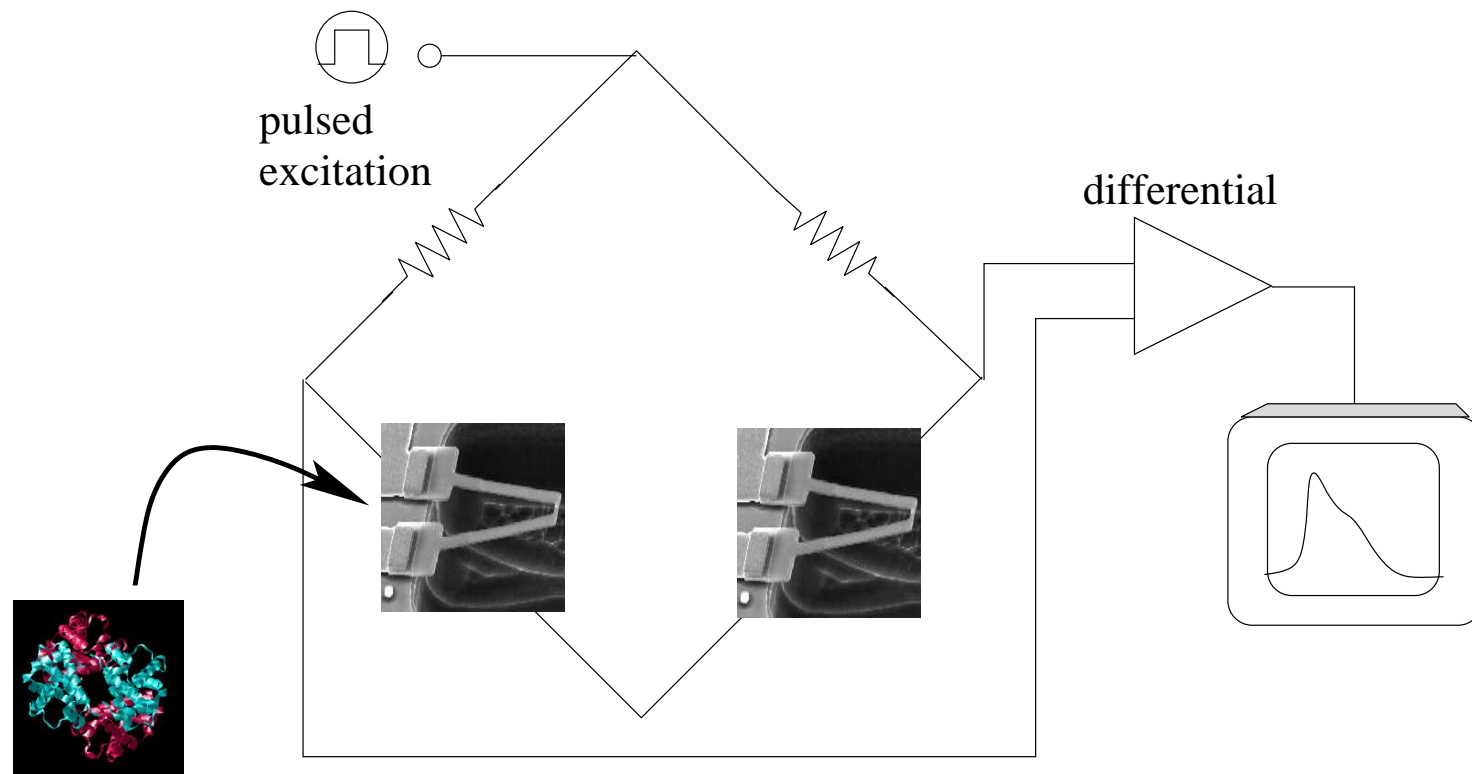


Image courtesy of Cara Wykowski, Microcal, Inc.

Implementing Calorimetry with MEMS Heaters

Use bulk Si micromachined cantilevers from the ARS program as heaters and thermometers.



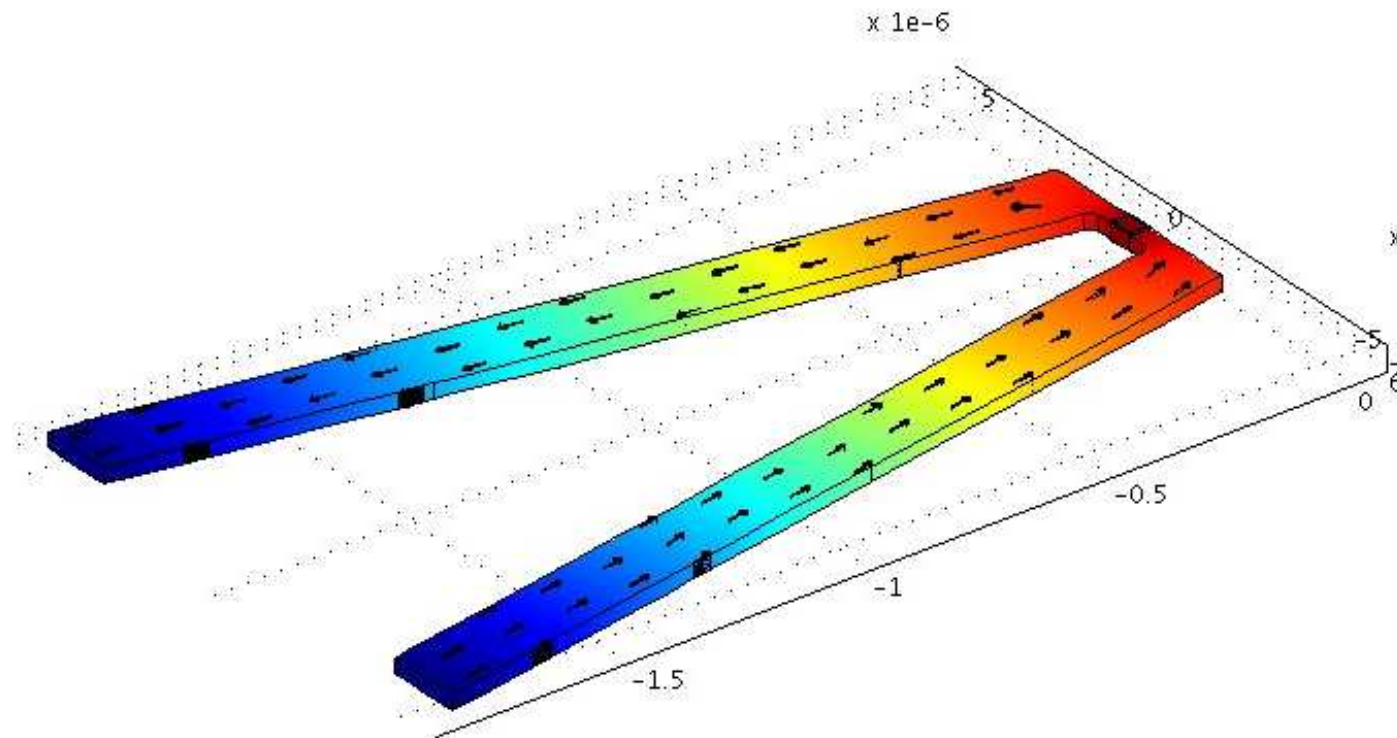
Cantilever image (and cantilevers) courtesy of Peter Hartwell.

Challenges

Biggest problem: high surface/volume ratio increases parasitics.

Proposed solution: pulsed measurements.

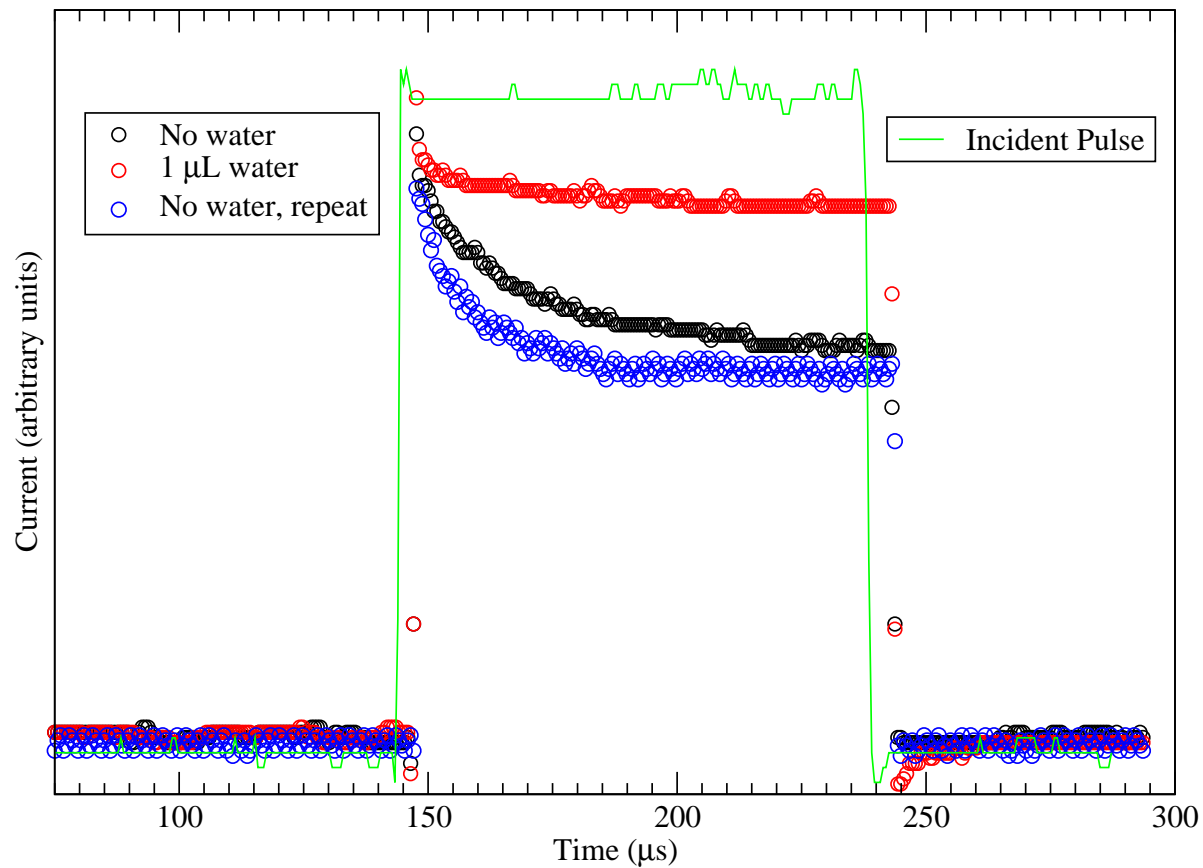
Modelling effort underway with FEMLAB



Achieved good agreement with old ARS data and models.

Extension of calculations to parameters relevant to calorimetry is underway.

Acquisition of data is underway



Difference between water and no-water cases is due to change in thermal boundary condition.

Summary

- Low-cost healthcare products aimed at consumers is an appealing business for HP.
- We have chosen protein calorimetry based on fundamental considerations and existing capabilities.
- Equipment building is nearing end; device and system optimization is just beginning.
- Thanks to Peter Hartwell, Uija Yoon, Henryk Birecki, Bob Walmsley, Lung Tran, Manish Sharma, Eric Montgomery and Jack Cattolico.
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