

TechnoBusiness Forum -- 2005

Open Innovation

-- Enterprise Transformation --



Nanotechnology – A Firm’s Evolving Experience

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Buckman Laboratories**

Buckman Laboratories And Open Innovation

Some Background

- Buckman Laboratories is a *privately owned*, multi-national speciality chemical supplier
- We have a *robust, internal R&D organisation* supported at roughly 3.5% of revenue
- About 28% of our annual sales are from *products less than 5 years old*
- Our R&D organisation is headquartered in Memphis TN, with involvement from our operating companies through *formal networks in various parts of the world*
- We work with *universities, industry-based research organisations and customers* to bring new technologies to market

Additional Background

- Our involvement with nanotechnology includes the use of nanometer-scale materials –
 - ✓ *Particulate retention aid systems*
 - ✓ *Structured proteins*
- Much of our current work is focused on modifying the properties of surfaces –
 - ✓ *Deposits and deposition-prone surfaces*
 - ✓ *Fibres and other furnish components*
- And we have an abiding interest in new technology

Open Innovation, The Philosophy

- The hardest part is understanding –
 - ✓ *What are we best at – competencies?*
 - ✓ *What should we not try to do ourselves?*
 - ✓ *What are our greatest needs?*
 - ✓ *What are our customers'/industries' needs likely to be?*
 - ✓ *Where can we find innovation synergies?*
 - ✓ *Where can we find commercialisation synergies?*

The Philosophy

- We have found that, *with our partners*, we must –
 - ✓ *Achieve a mutual understanding of goals and responsibilities*
 - ✓ *Be open to sharing control and credit,*
 - ✓ *Be willing to spend time managing priorities and resources*
 - ✓ *Assign a project manager with primary responsibility and the internal clout to make things happen*

So How Does This Work?

- The relationships we form are based on *enlightened self-interest* –
 - ✓ *Each party will take something away from the arrangement, usually more than what they could have achieved on their own*
 - ✓ *The arrangements range from simple fee-for-service to full development partnerships*
 - ✓ *IP ownership may range from 100% Buckman to joint patents, depending on the relationship*
- We will co-locate researchers *with our partners.*
- We will *have customer research staff run tests in our labs on new technologies*

What About Internally?

- We use two mechanisms to drive these programs –
 - ✓ *A centres of excellence network structure*
 - ✓ *A formal team formation, development and facilitation process*
- Both work to focus the organisation and individuals *on defined programs*
- Both may involve *external partners for part or all of the project*

And Our Customers?

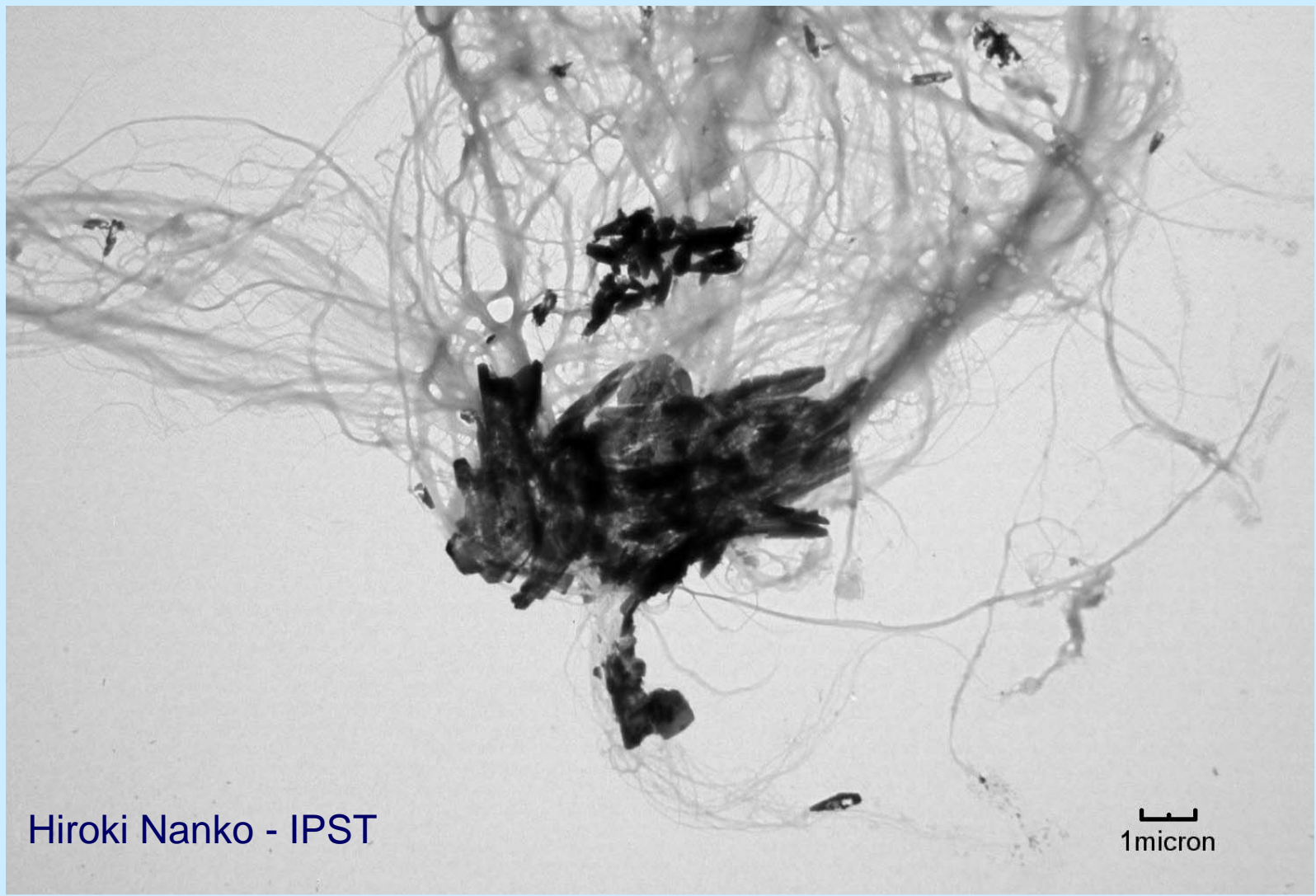
- We have *regular involvement* with customer researchers and research organisations –
 - ✓ *Conceptualisation*
 - ✓ *Needs identification*
 - ✓ *Project prioritisation*
 - ✓ *Joint project teams*
 - ✓ *Joint developmental trial teams*
- All meaning that *we work to understand each other's capabilities*, how they can be brought to bear and that we talk regularly to one another

Some Examples

Open Innovation In Action.

Imaging Techniques

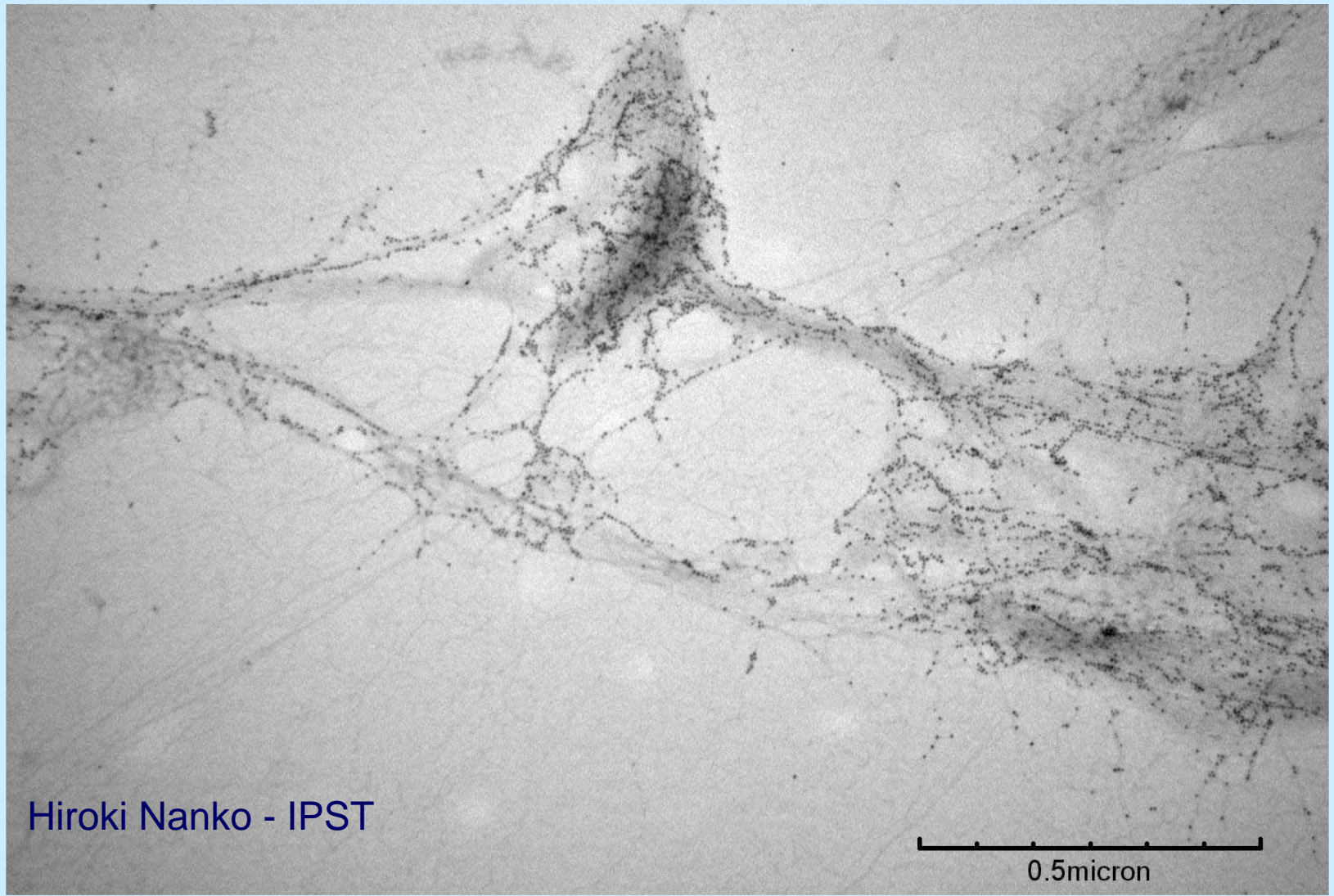
- In order to better understand the performance of *a new microparticle retention aid*, we needed imaging capabilities that were not available in our labs.
- Dr. Nanko and his team at IPST were able to make images using a new technique which greatly aided in our *understanding of the function of the product*



Hiroki Nanko - IPST

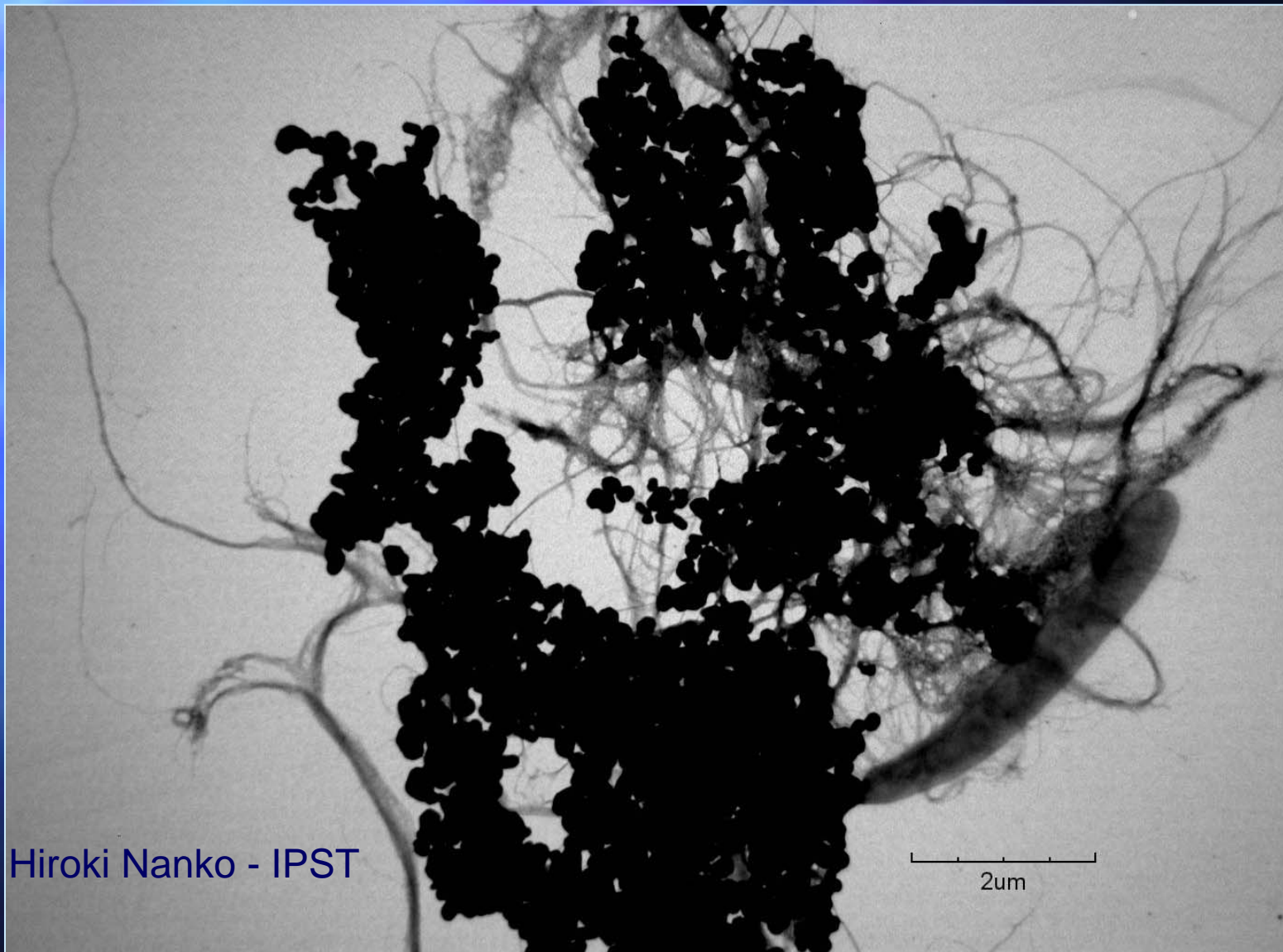
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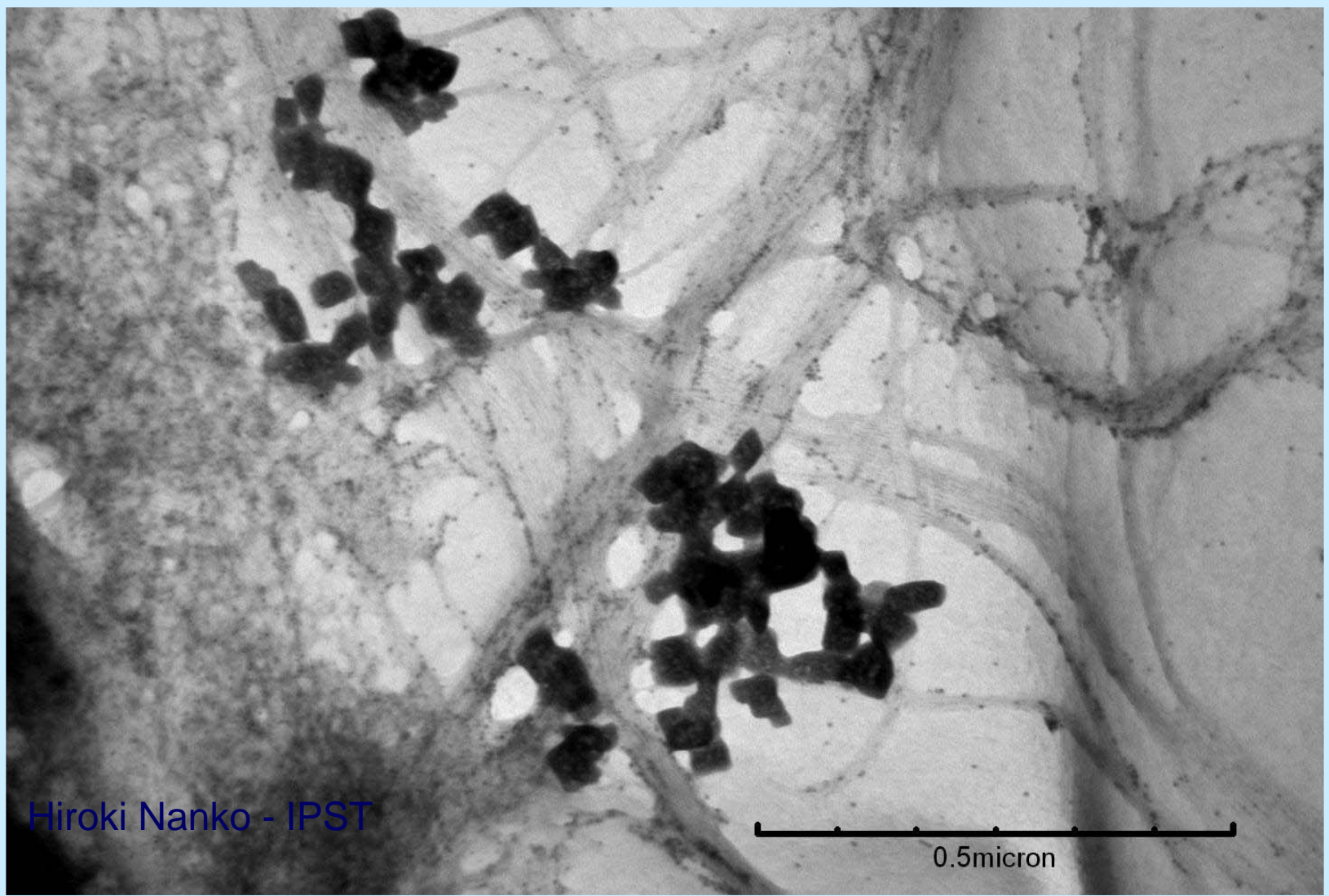


Hiroki Nanko - IPST

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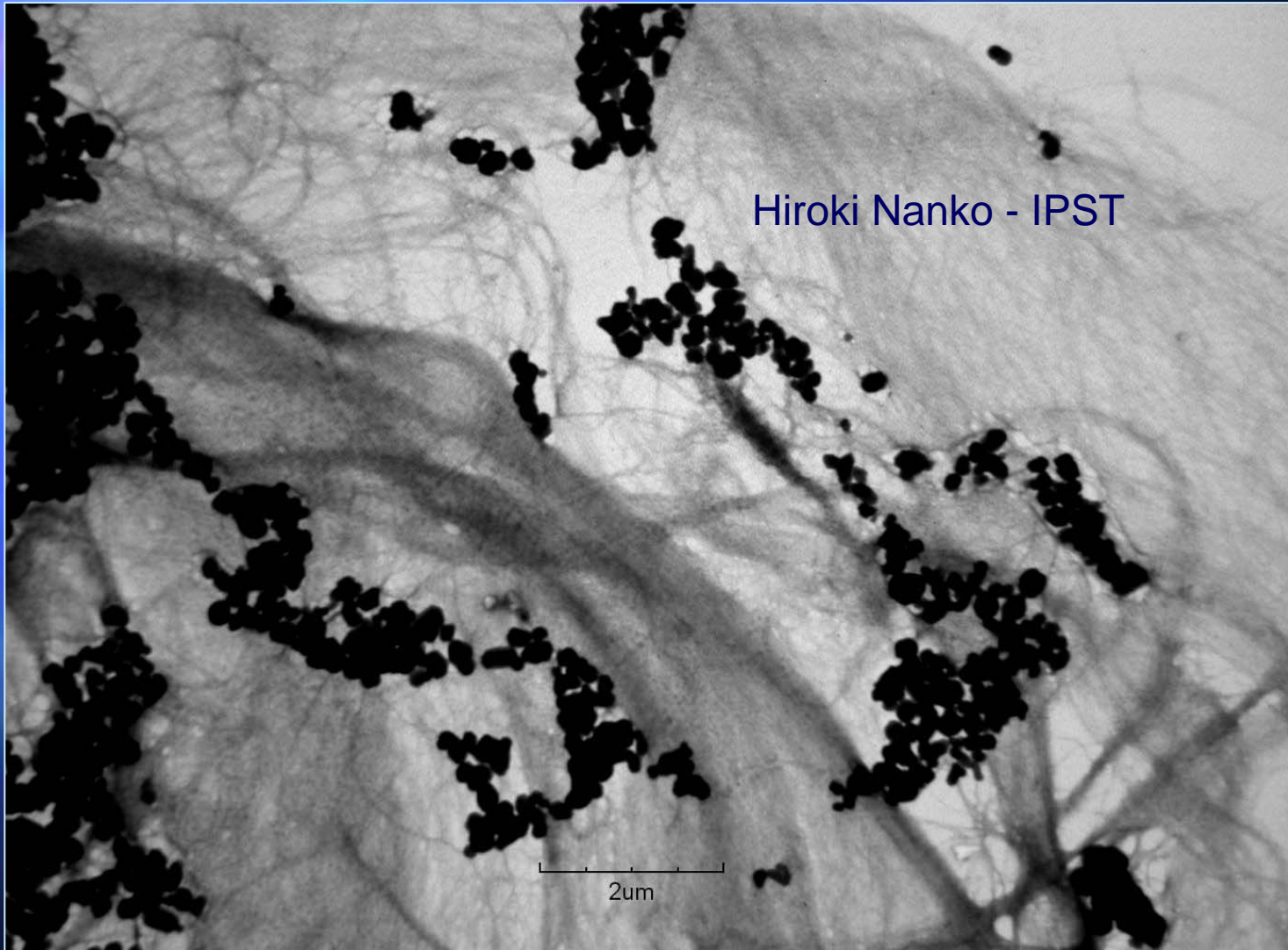


Hiroki Nanko - IPST



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Hiroki Nanko - IPST

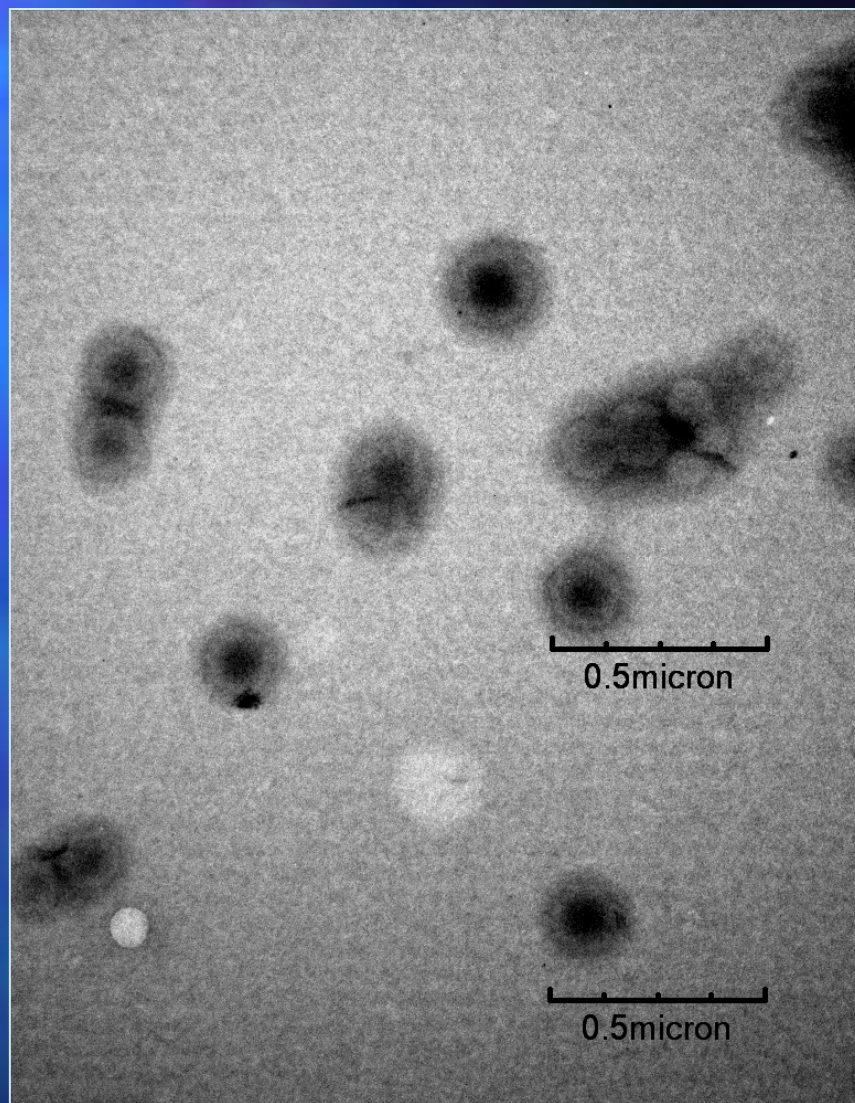
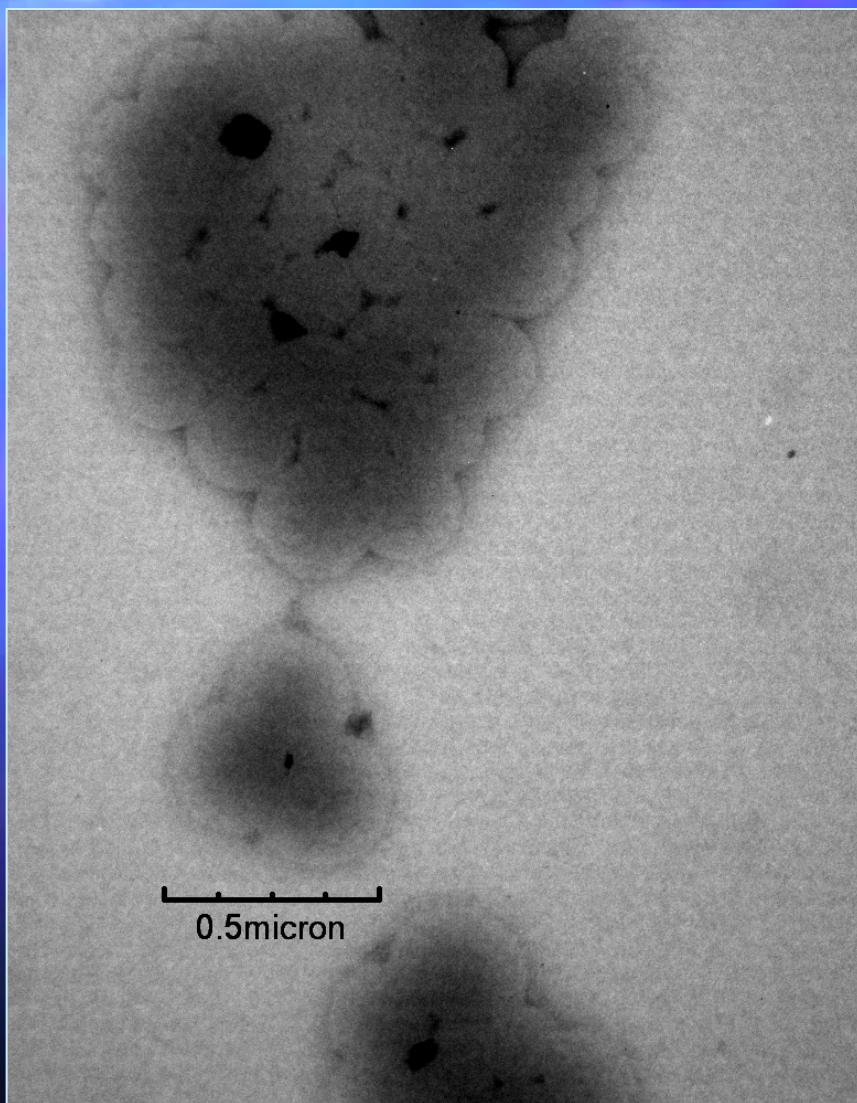
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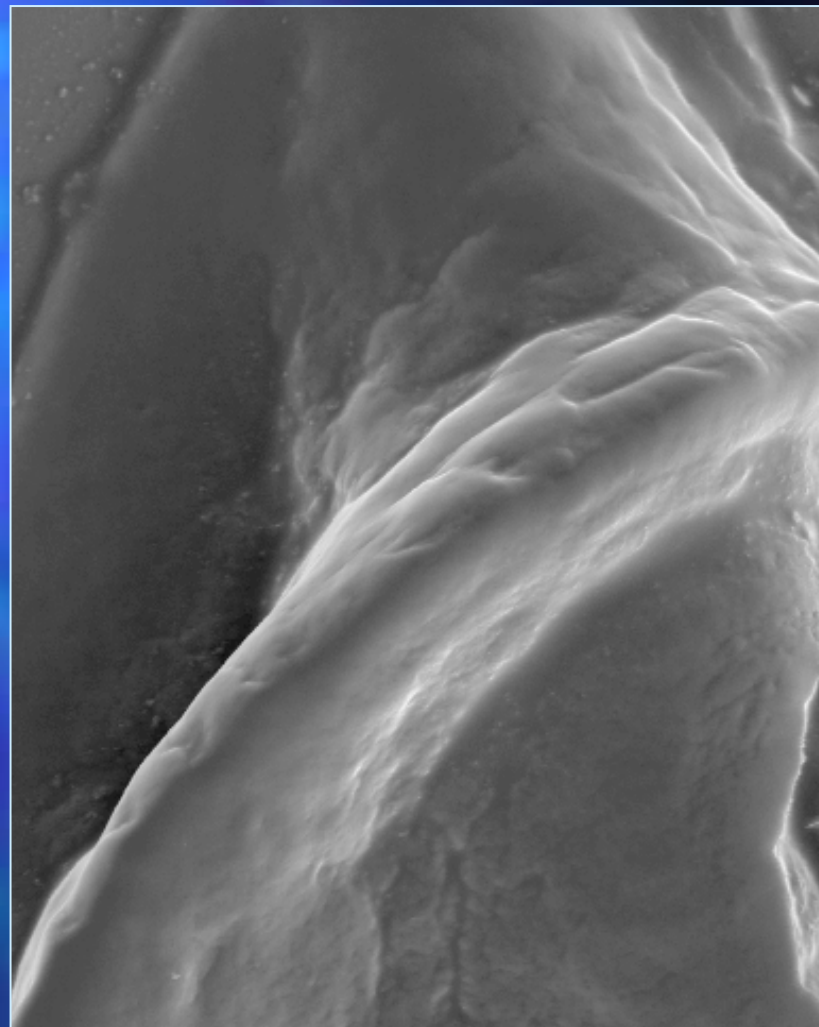
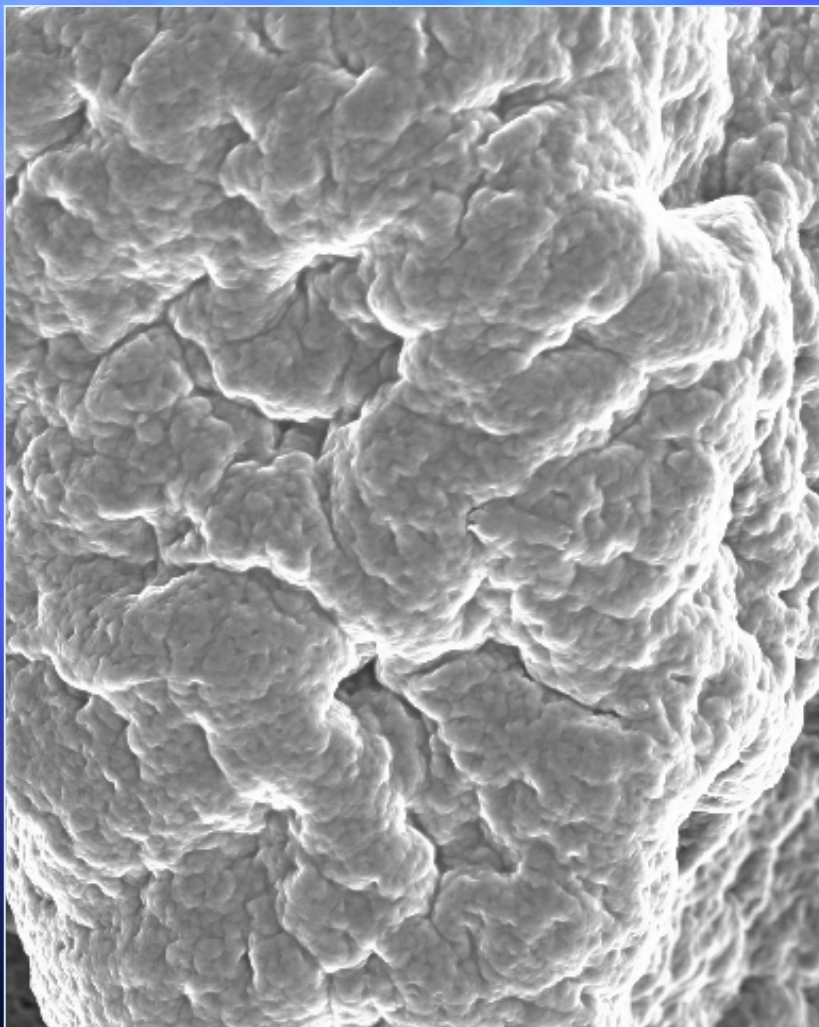
The Impact

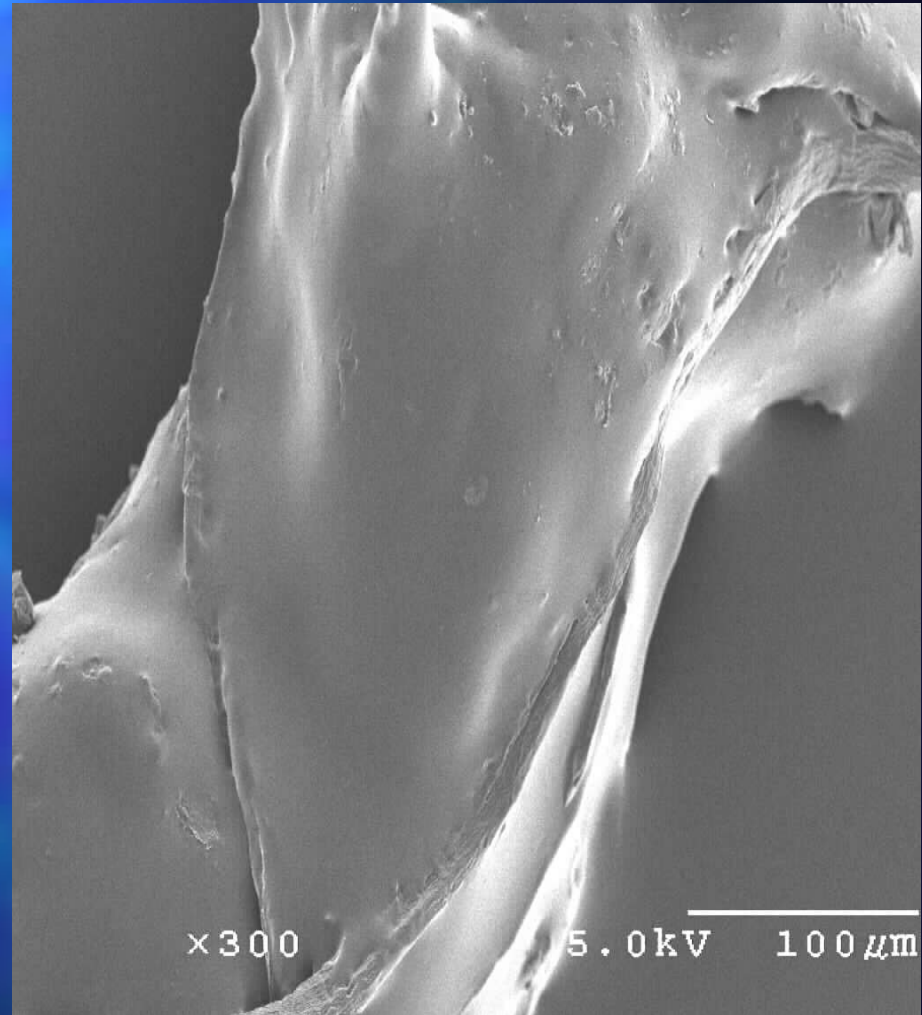
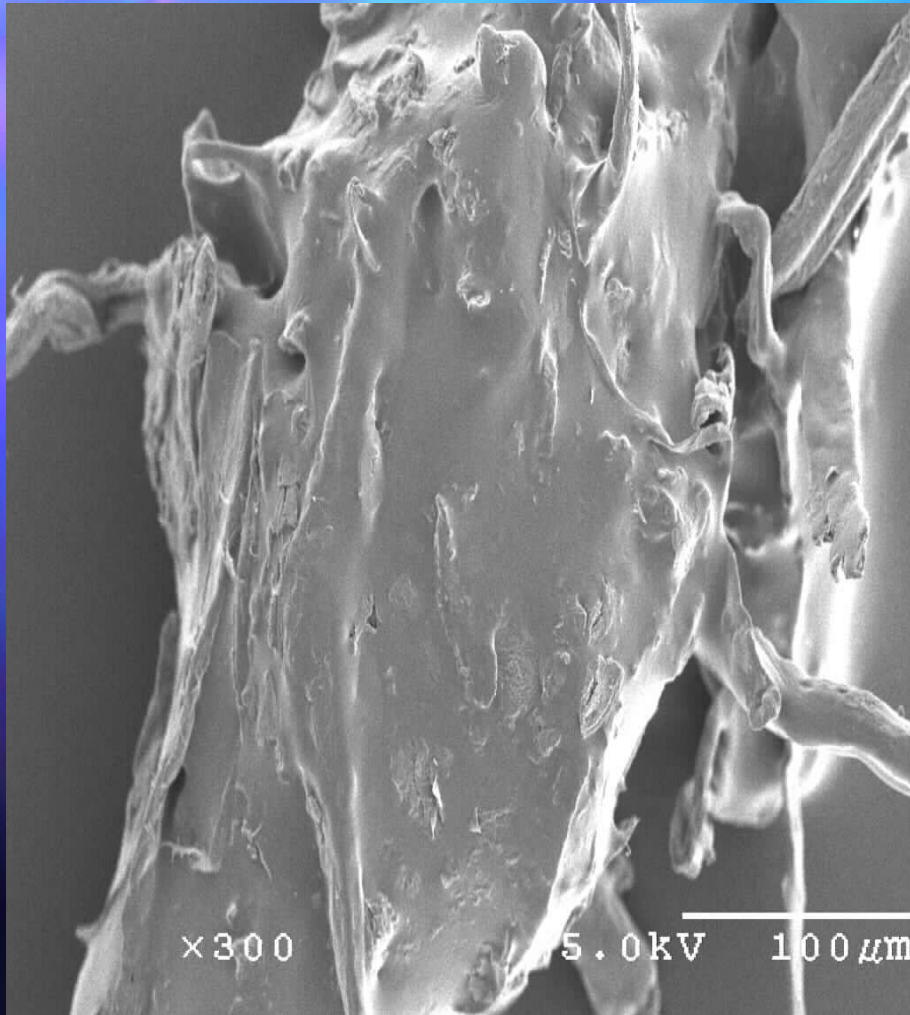
- IPST gained support for the development of a new imaging technique, and expanded its use *into an area as yet unexplored*
- We gained knowledge that helped us better define *how the product could be best used in papermaking*

Applied Biotechnology

- We discovered that a particular type of enzyme had some promise to remove stickies from secondary fibre
- To develop this concept, *we partnered with a major enzyme supplier, not currently supplying to the paper industry*
- Our experience with papermaking, and our in-house testing facilities, helped them understand what properties were needed in a new enzyme product.
- *We each hold patents, some joint, on the new technology*





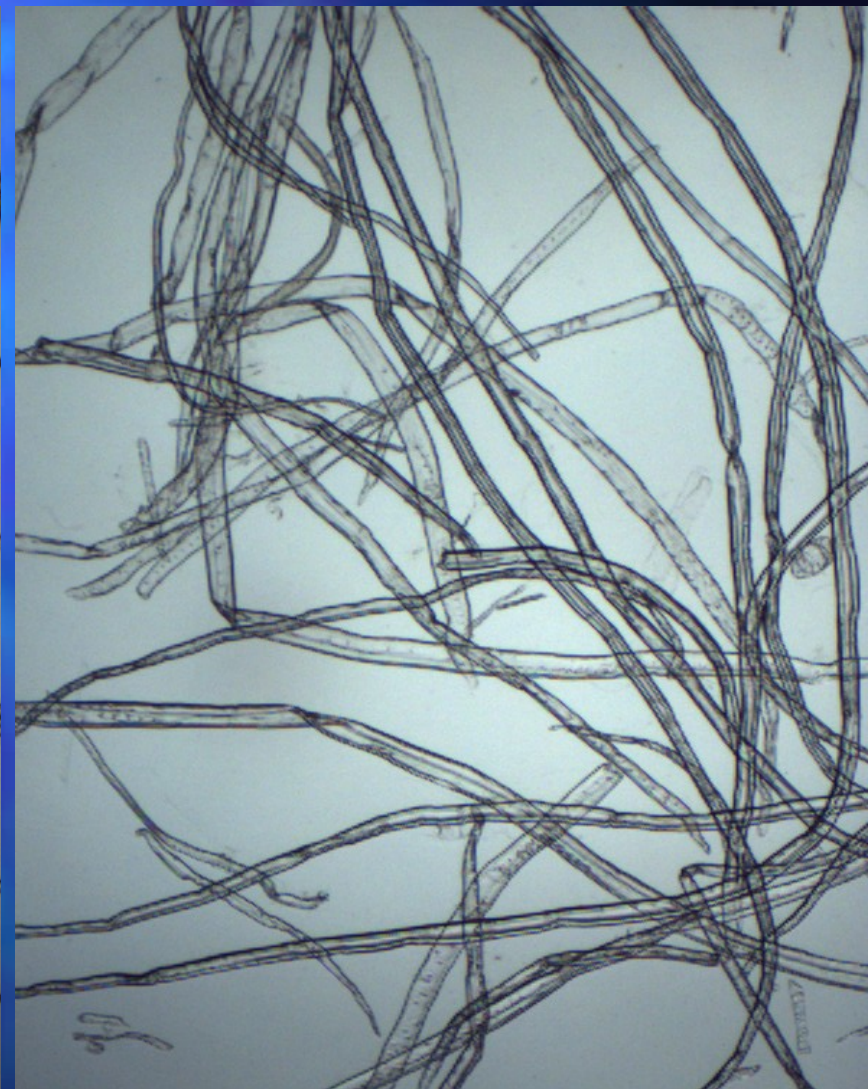
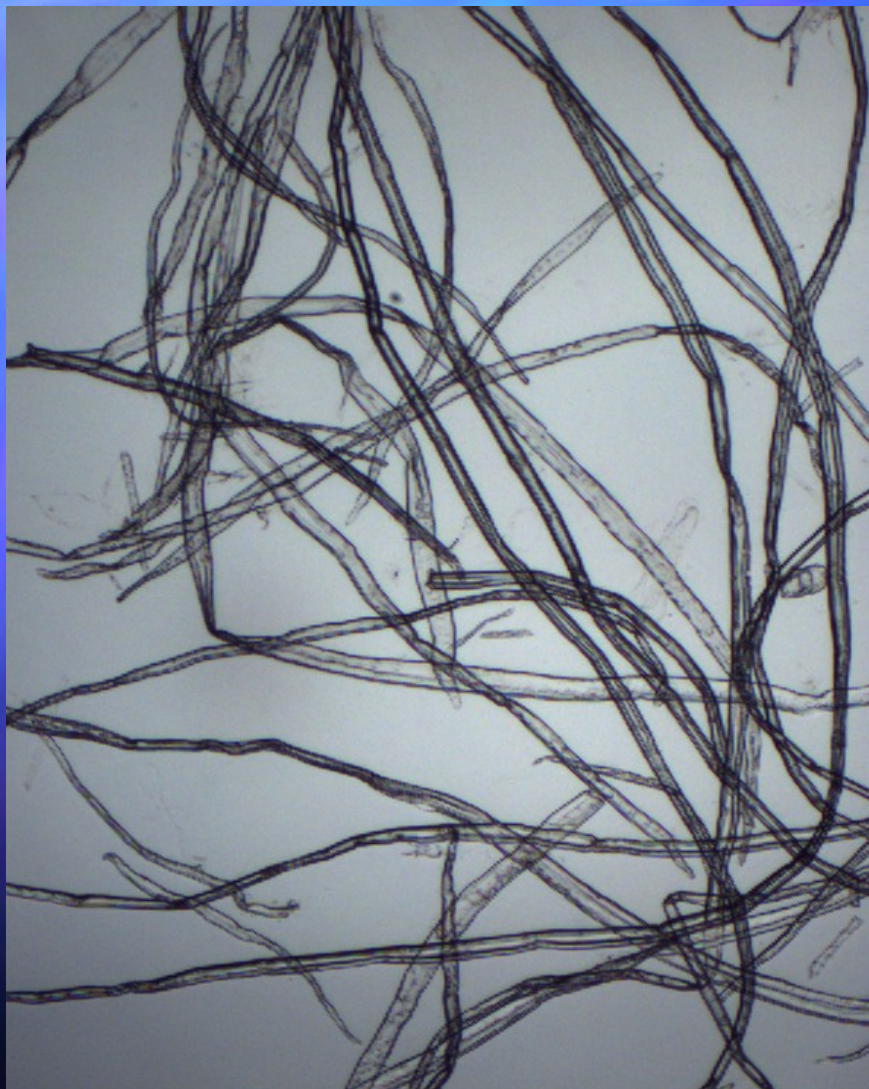


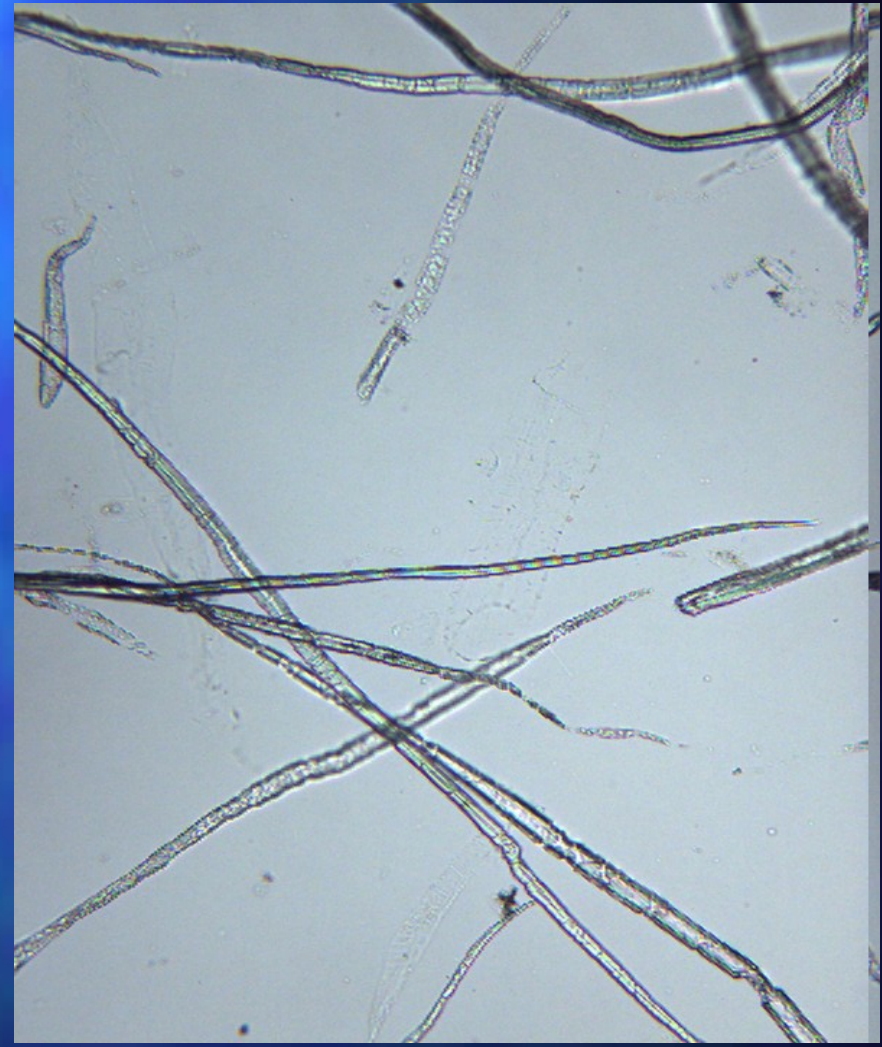
The Impact

- *We gained a new field* of technology for application to the paper industry
- *Our partner gained* a new use for on-the-shelf capabilities and manufacturing infrastructure

Fibre Modification

- Several of our papermaking customers have an interest in modifying fibre by other than mechanical means
- The needs are various, depending on the furnish and grade –
 - ✓ *Conformability*
 - ✓ *Strength*
 - ✓ *Stiffness*
 - ✓ *Dust reduction*





The Impact

- Our customers have been able to –
 - ✓ *Substitute less expensive fibre, modified for specific properties.*
 - ✓ *Achieve performance targets not previously attainable*
- We gained access to production scale facilities to develop the technology
- We gained immediate input on what was practical and acceptable from a paper-maker's standpoint

Key Learning...

- *No one person* built the railroads
- *It took several technologies* maturing at the same time to make it happen
- So it is today – *it will be partnerships that will turn the science of nanotechnology* into a practicable technology
- And it will be those companies and institutions that *are willing to share their knowledge* who will lead, and benefit