



Silicon Valley: An Innovation Ecosystem

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University Relations & External Research

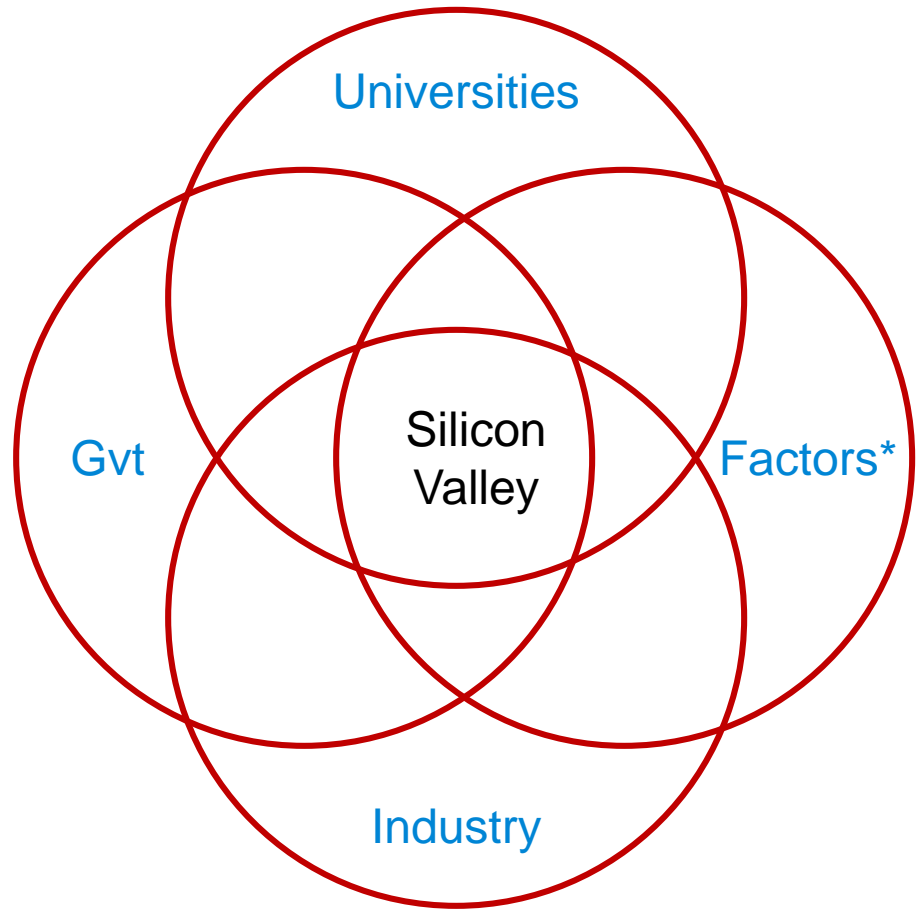
Agilent Technologies

September 7, 2016



Research, industry and innovation in Silicon Valley

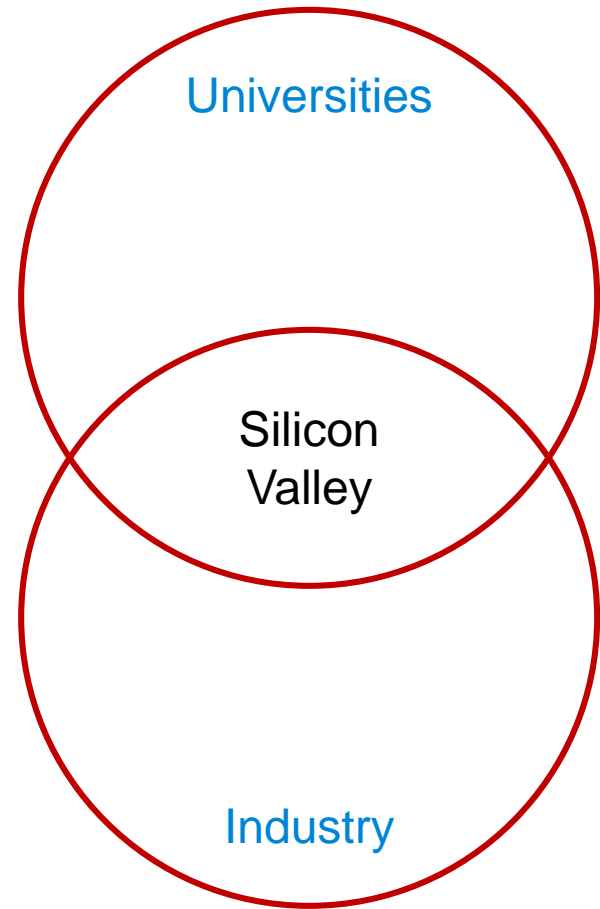
- How do partnerships and collaborations with universities and research institutions come about?
- Are they initiated by you, or by the institutions? Do they develop organically from informal collaborations, or [is there a corporate effort to] cultivate new partnerships?
- What can Danish legislators do to create a better framework for industrial partnerships with Agilent?



*talent, capital, suppliers, etc.

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Agilent:

Industrial Innovation

and

Academic Outreach

A Brief History of Agilent

1939–1998: **The Hewlett-Packard years**
60-year heritage of leadership and innovation

1999: **Agilent is born**
Biggest IPO in Silicon Valley: \$2.1 billion

2005: **Agilent refines scope**
Focus on measurement. SPG.

2006–2010: **Transformation**
Acquisitions, divestitures and restructuring

2013: **World's premier measurement company**
\$6.8 billion revenue

2013: **Agilent announces spinoff of Electronic Measurement**
Agilent to focus on Life Sciences, Diagnostics and Applied Chemical markets

2014: **Agilent spins off Keysight Technologies**
The spinoff is final Nov. 1, 2014, through a tax-free distribution of Keysight common stock

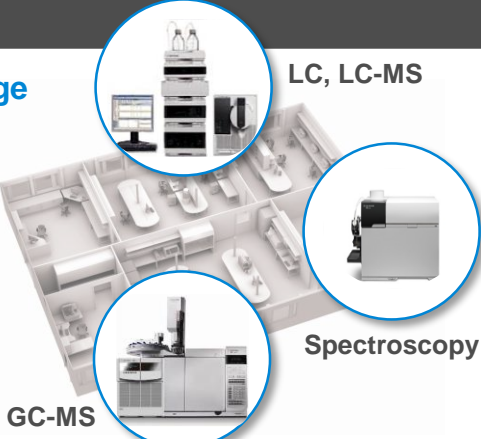


Leveraging Analytical Lab Strength for Genomics Research and Cancer Diagnostics

ANALYTICAL LAB

Versatile, leading-edge analytical tools

- Separations
- Spectroscopy
- Mass Spectrometry
- Consumables, Services, Informatics



LC, LC-MS

Spectroscopy

GC, GC-MS

ROUTINE CLINICAL & DX

Full solutions for advanced diagnostics

- H&E Staining
- Advanced Staining
- FISH probes



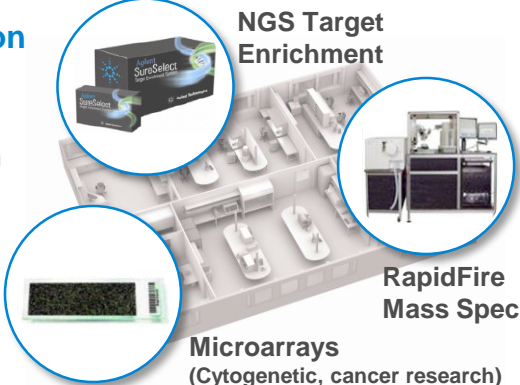
Dako Omnis

Dako IQFISH

CLINICAL RESEARCH

Enable the transition from discovery to diagnostics

- Cytogenetic Solution (aCGH)
- SureSelect
- LC-MS
- SureFISH



NGS Target Enrichment

Microarrays (Cytogenetic, cancer research)

RapidFire Mass Spec

Agilent Research Laboratories

Competitive advantage through technology

Applied research

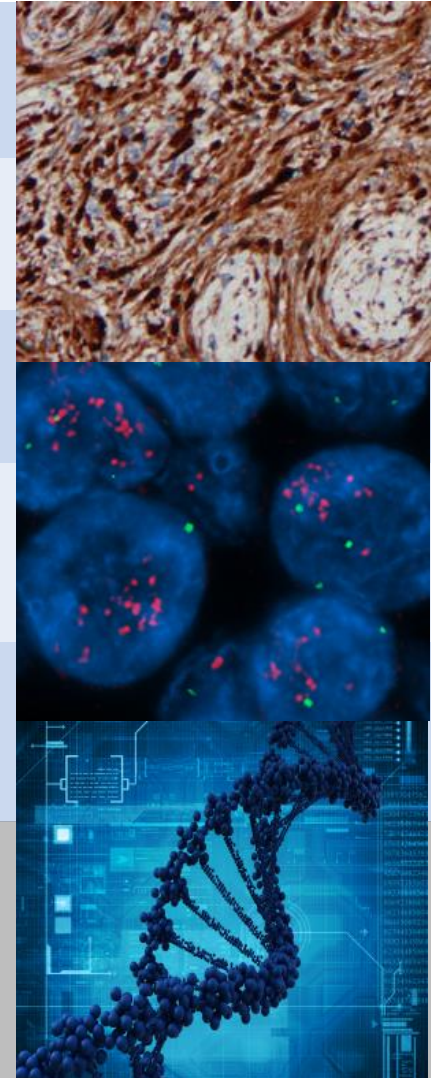
Breakthrough technologies

Innovation synergies across product lines

World-class research teams
across multidisciplinary, global organization

Collaboration with leading
academic, government & industrial researchers

Partners to Agilent's businesses
in R&D commercialization



Technology Platforms

Automation

Bioreagents

Chemistries & supplies

FISH probes

Gas chromatography

Immunohistochemistry

Informatics

Liquid chromatography

Mass spectrometry

Microarrays

Seahorse

Services

Spectroscopy

Target enrichment

Science & Measurement Are Inextricably Linked

Ongoing cycles offer continual new challenges

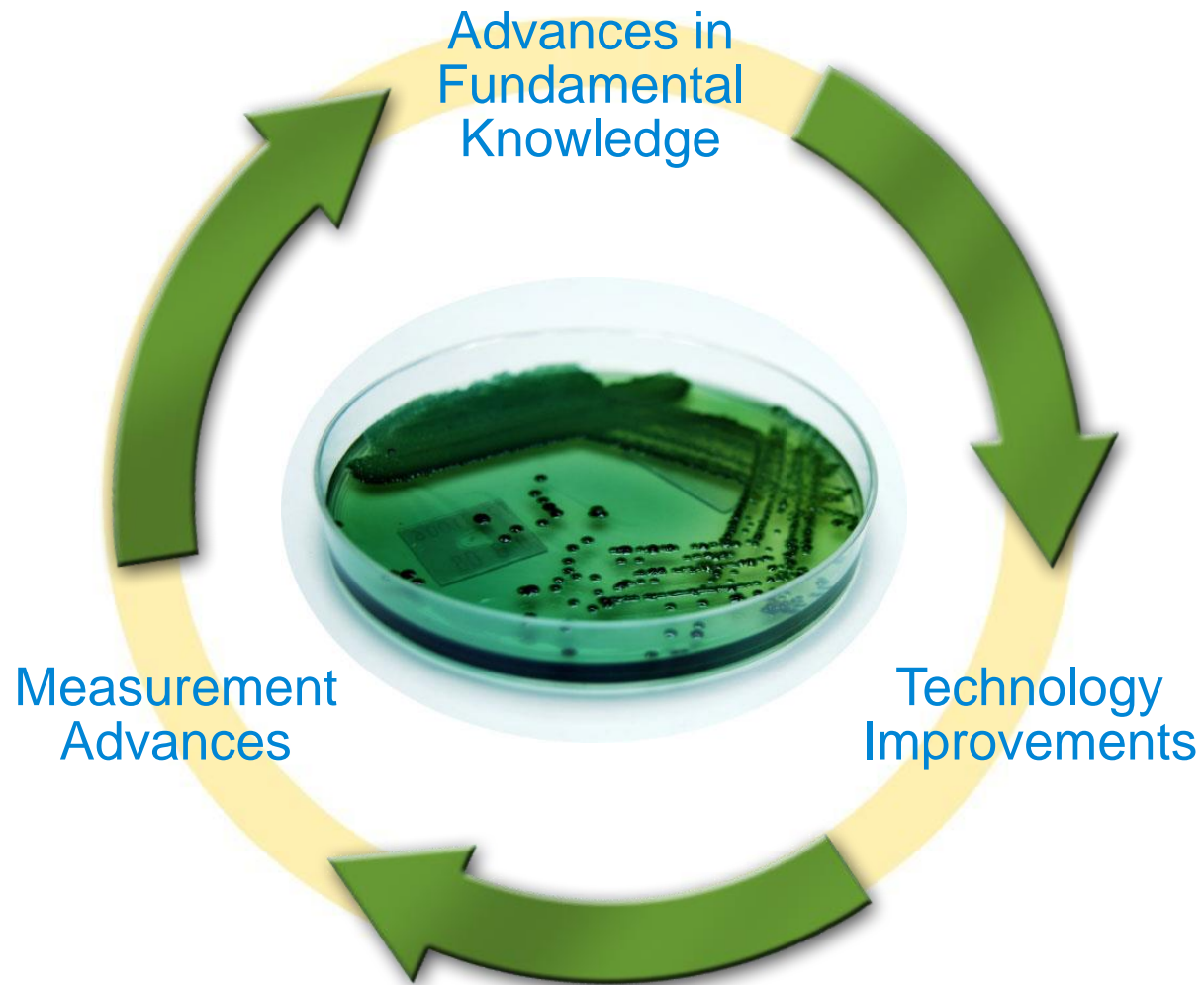
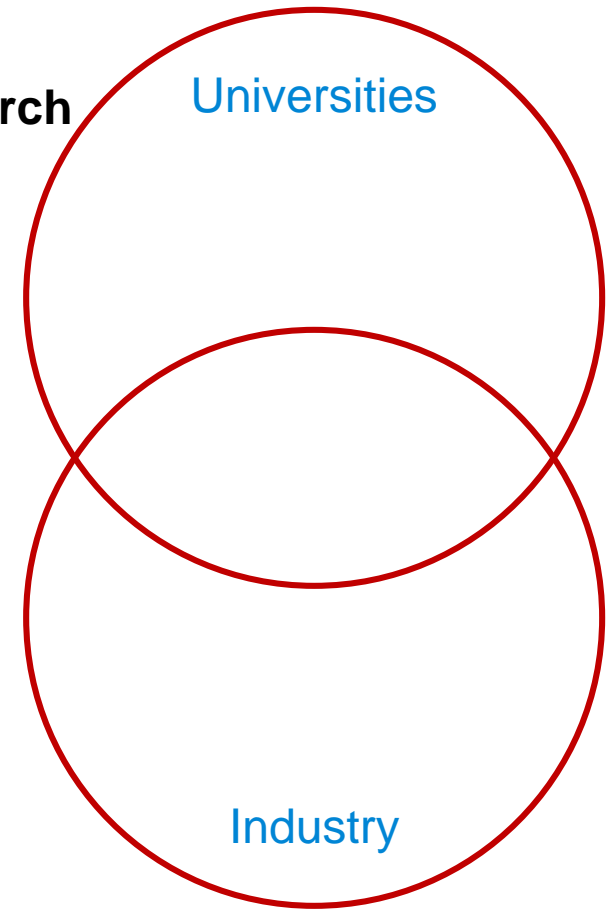


Image: Bacterial culture of aeromonas hydrophila

Overview of University Programs

- **Thought Leader Awards**
- **Applications and Core Technology: University Research**
- **Agilent Early Career Professor Award**
- Field/Research Support Program
- New Professor Program
- Product line collaborations
- Curriculum and App notes
- Branded Laboratories
- Community outreach to local schools
- Volunteer Adjunct Professors
- Matching of Employee Personal Donations



Purpose of University Relations at Agilent

- Build connections between Agilent technical leaders and relevant programs at the world's great universities

Relationships

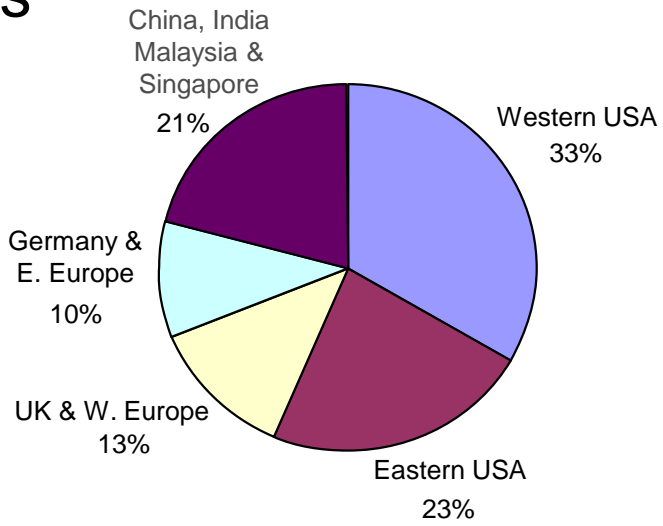
Recruiting

Research

Revenue

- Support our corporate citizenship objective to give back to communities in which we do business

Since 2006, we have supported more than 200 mentored connections at 91 universities in 19 countries.



A Global Academic Network

>100 active university collaborations. Leverage of Gvt programs (EU, Brazil, etc.)



Agilent Thought Leader Program

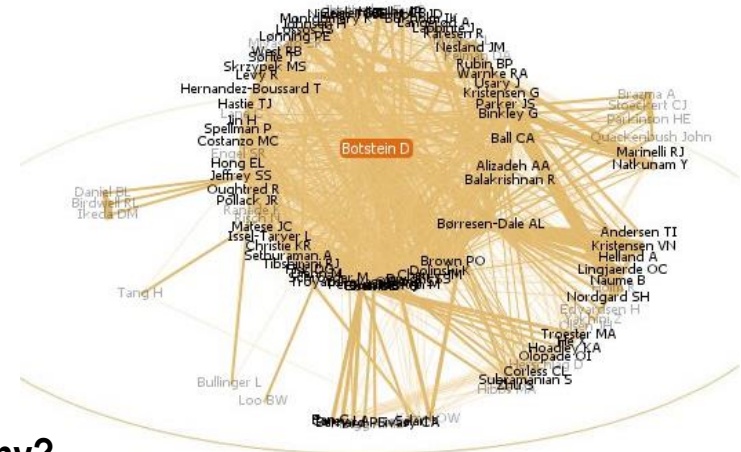
Thought Leader Awards

Promote fundamental advances in life science through contribution to research of thought leaders

- Align societal trends, academic research and rapidly advancing Agilent measurement platforms:

Synthetic Biology, Molecular Imaging, Clinical Genomics and Translational Pathology, OMICS and integrated biology applications, and Analytical Technologies for Sustainable Agriculture

- Candidates selected based on scientific leadership, productivity, project significance (invitational program)
- High-level executive sponsorship and active support throughout Agilent enable breakthrough research



Why?

Demonstrate Agilent's contribution to the advancement of the academic enterprise

Advance application of Agilent products and services, solving problems that matter

Teach the world what our products can do



Agilent Early Career Professor Award

- Promote excellent research of importance to Agilent and the world
- Establish strong collaborative relationships between Agilent and next generation thought leaders
- Leading departments around the world nominate their best and brightest recent hires
- Agilent selects 5 Finalists, all are 'winners', most with follow-up actions
- Award focus varies each year
- 2016 award on "Big data in life science research and imaging for clinical diagnostics" just selected



Michael Jewett (2011) Associate Professor
Northwestern University.
Integrated biology: relating different views of biological systems to contribute to the understanding of life.



Anthony Mittermaier (2012)
Associate Professor
McGill University.
NMR techniques to improve the understanding of structure and function of biomolecules.



Jindan Yu (2013) Associate Professor
Northwestern University.
Multi-analyte tools for proteomic and/or genomic biomarkers for cancer pathology.



Paul Blainey (2014)
Massachusetts Institute of Technology
Single-cell measurement technologies to investigate molecular properties and dynamics in populations of cells.



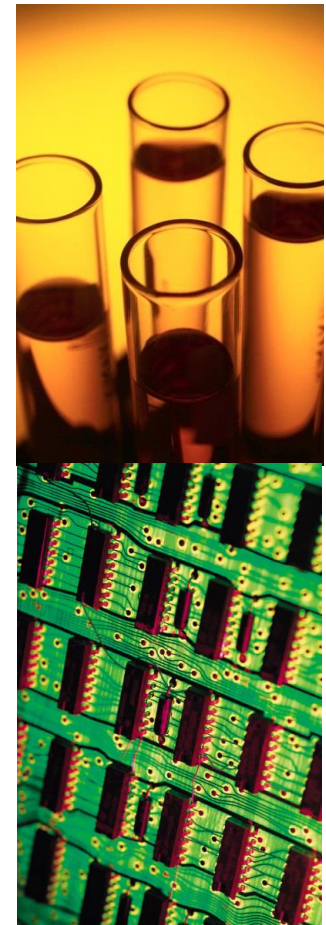
Mitchell Guttman (2015)
California Institute of Technology.
CRISPR/Cas or other RNA-based technologies for genome editing, control, and other applications.

University Research Grants Program

Agilent supports and benefits from leading, relevant university research

- Connect to world-leading university researchers with deep expertise in technology or applications of interest.
- Active Agilent technical staff participation, contributing measurement expertise and knowledge of problems that matter.
- Agilent seeks to learn of new applications for our products with broad impact and to explore new technologies with the potential to enable product advancement.

Proposals Originate with Agilent Technical Staff



Basis for collaboration

Industry

Limited internal investment in basic research; excel in execution

Innovation imperative: bringing technologies to market profitably

Require talent to thrive

Insight into industrial relevance

Invest in the factors of production

Require customers with product understanding

Academia

Push the frontiers of knowledge

Value learning over scale of execution

Educate talent

Seek problems of future importance

Invest in people and advanced research infrastructure

Teach application of technology tools

Points of Tension

Industry

Short-term, proprietary interest
Desire predictability, execution

Control

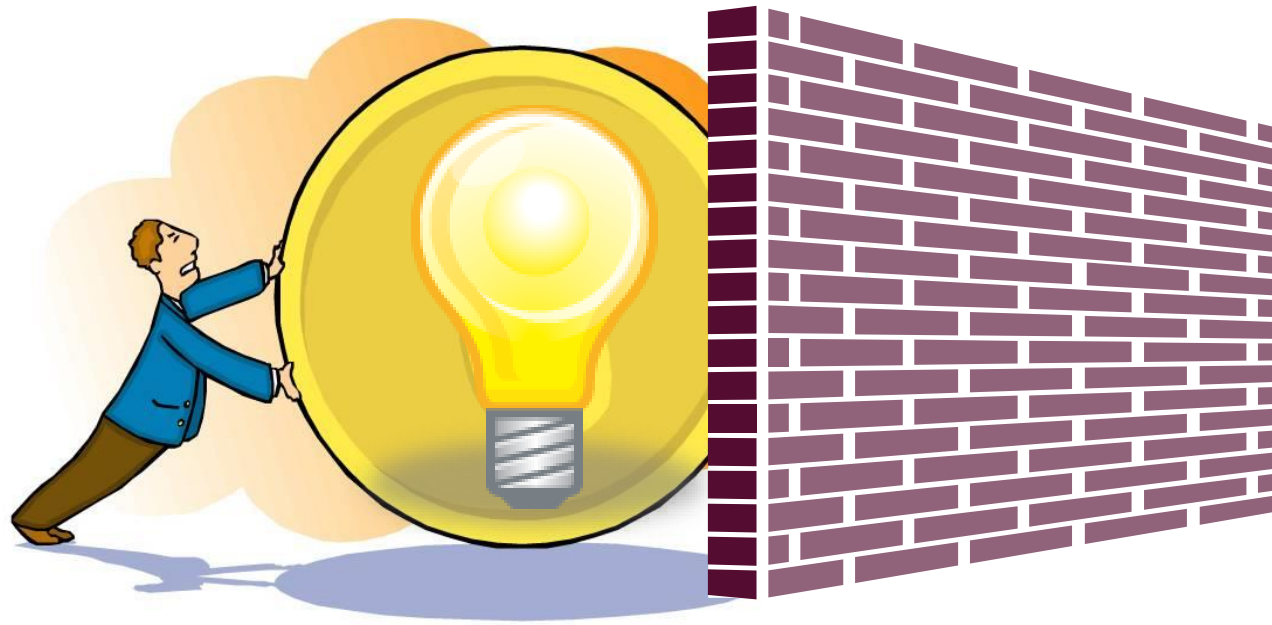
Own IP

Academia

Theoretical advances. Publication
Focus on work where the outcome is not known; prize the unexpected

Academic Freedom

Own IP



Pushing an idea is hard!

Role of an Industrial Mentor

The **key** to adding value through university relationships

- **Cooperatively define programs** of mutual interest
- **Actively contribute** expertise, judgment, knowledge of commercial technical trends, and experience to the research program
- **Participate.** Spend time on campus. Attend related seminars and research group meetings.
- Build a circle of **acquaintances** with faculty and students
- Help talented **students seeking employment**
- **Assess** research
- Report findings, **motivate use**

Best Practices

Build structures to foster collaboration

Build collaborative ties among students, faculty, and an industrial partner's technical staff

Focus on excellent academic work in areas of industrial relevance

Avoid short-term deliverables and IP

Universities should expect *more* than money from industrial partners

Cultivate opportunities for partnership; allow them to emerge!



Principles for Successful Academic Collaborations

Design

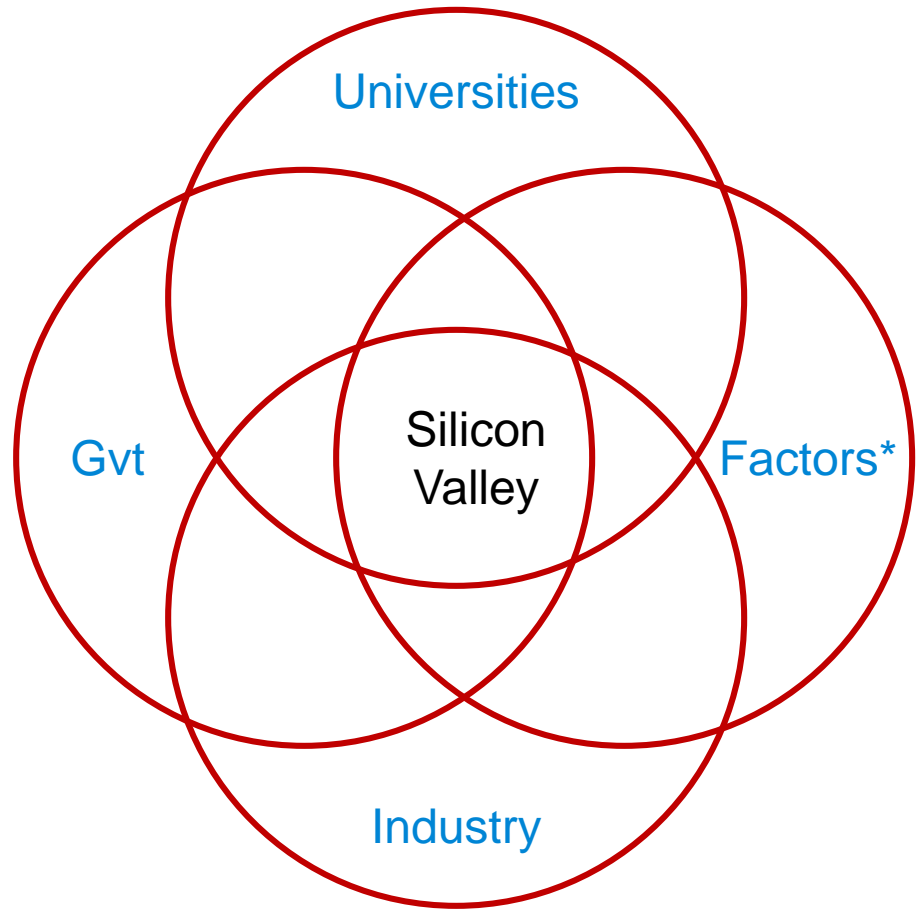
- Must advance PI and university research interests
- Funding enables good work, does not direct it
- Motivated company participant, able to travel, with management support. Show up and make a difference.
- Tech transfer depends on the company participant, not the PI. IP is usually not the primary value.

Expectations for Execution

- Efficient administration: payments, equipment, staffing, etc.
- Clear start, good alignment
- Diligent progress, assigned resources, attention to publication
- **ACTIVE PARTICIPATION**
- Open communication, periodic reviews, annual report, final wrap up.
- Adjustments based on learning
- Strong results are more important than schedule
- Better results through collaboration, share the good news

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The Newly Emerging Community of Technical Scholars

"consists of universities which have strong programs in engineering and science, surrounded by companies emphasizing research and development, under conditions where there is continual interaction among all of the components, some formal, some informal, some organized, others unorganized. . . . Industry is finding that for those activities that involve a high level of scientific and technological creativity, a location in a center of brains is more important than a location near markets, raw materials, or factory labor."

- Frederick Emmons Terman, 1963

Stanford Honors Co-op Program



Why Silicon Valley?

Innovate: Make changes in something established, especially by introducing new methods, ideas, or products

- www.oxforddictionaries.com

- Why not Berkeley?
- Labor law. Employment at will. Non-compete agreements.
- Popular acceptance of change. Uber in Paris and San Francisco.
- Employee ownership/stock options
- Complex systems evolve. Look at the origin.
- Employment attitude. Loyalty and contribution.

Acknowledgements

These remarks were inspired by helpful conversations with and the writings of:

- Dr. Clayton Christensen
- Dr. Stephen B. Adams
- Dr. Henry Chesbrough
- Dr. CK Prahalad

Q&A

For more information:

<http://www.agilent.com/go/universityrelations>