

# **From Academia to Venture Capital Adventures in Engineering Research and Business**

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I'm delighted to speak with you this evening. I have fond memories of my own involvement over the years in US-Japan activities going back to the early 1970's. I guess that's almost 30 years ago now! In fact, I made my first trip to an international conference on plasma physics and fusion energy research in Tokyo in 1971. Since then, I've been involved in many US-Japan programs, given guest lectures at Universities and to industry groups such as the Keidanren in Japan, and co-led a number of major US-Japan cooperative research programs in the field of fusion energy research. I even took part of a sabbatical in Japan - at Nagoya University - around 1985, and that was a wonderful experience. So speaking to a group of researchers from Japan and the US is a special delight for me.

I titled my remarks- From Academia to Venture Capital - Adventures in Engineering Research and Business - to convey the idea that careers take many turns - often unexpected - and that the friendships and relationships you make along the way, at meetings like this one, will lead to surprising outcomes in the years to come. What I'd like to do this evening is describe that journey for you to give you a sense of the changes that can occur in a career, and the fun one can have along the way. I'll end up as Managing Director of one of Southern California's largest venture capital firms focused on early stage high tech and biotech investing. Towards the end of the talk, I'll append a set of powerpoint slides and describe the role and status of venture capital investing in the U.S.

My adventures started in 1970 at the University of Wisconsin, where I began an academic career. What I cared about most at that time, aside my teaching responsibilities, was research. And while I had a deep interest in science, I also had a strong desire to work on problems where I could see the impact in practical terms. I think in many ways that outlook defines an engineer.

In my case, my fields were nuclear engineering, nuclear physics and plasma physics, and the application my colleagues and I had in mind was no less than to help the world develop a new energy source for mankind – first working on nuclear power and then, for most of my career, working on fusion energy development. It's been a long road from there to Venture Capital – But I can tell you it has been extraordinarily interesting, exciting and fun!

In the 1<sup>st</sup> decade of my career, as I said, the focus was on research – both individual problems in plasma physics AND on fusion energy as a system. The key issue in the 1970's was to understand what it would take to build a practical fusion power reactor. This was a big topic also in Japan and remains so today, and it's why my first international conference in fact turned out to be in Japan.

In the 2<sup>nd</sup> decade, I moved from Wisconsin to UCLA and found that I had contracted the “builder/leadership” bug. While continuing our research projects in plasma physics and fusion energy, I also worked together with my colleagues to found the Institute of Plasma and Fusion Research, and today, UCLA has a very nice research building as a result.

In the 1980’s, we began major international research project in fusion and I’d like to describe it to you, because it involved Japan and the US, both using a Big Fusion Machine in Europe!

Since the 1960’s – the U.S., Japan, Russia and EC have all had major national projects aimed at developing fusion energy. Today, the extension of that cooperation is the International Thermonuclear Experimental Reactor, or ITER project, a \$5 billion project now being considered for construction at a site either in Europe or Japan. In the early 1980’s, we began a project to understand the nature of the interaction of a hot plasma with the boundary or chamber of a fusion device, a problem critical to the success of ITER or any fusion power project. The project involved NIFS and Nagoya University in Japan, UCLA and Sandia National Labs in the US, and the KFA- Julich and the ERM – Brussels. As well, there were two key industry groups, both in Japan, Toyo Tanso and the Japanese vacuum company, ULVAC.

While the program was successful engineering and science terms, it also built a great collaboration between the U.S. and Japan, and between my group and our colleagues in Japan.

And these relationships became important when the next big turn in my adventure occurred – STARTING A COMPANY.

At an age similar to that of many of you today, my students and I saw an application from our plasma physics research that could make major impact in the area of semiconductor manufacturing. This, by the way, was about the time when the transition in feature size- line width - dropped below 1 micron. We knew that a major change to what today is called “Low Pressure Plasma Processing – both for Etching and Deposition, would have to take place.

We founded a company to develop the equipment to make chips with feature size below a half micron, the products we developed proved to be very important, we were able to finance our company by getting backing from Venture Capital Firms, and in the end, we developed a really successful company. After four rounds of venture financing, we had a successful Initial Public Offering in 1995.

But that success didn’t come in a straightforward way – and here’s where the connections I’d made in Japan turned out to be critical. We were able to raise the money we needed from farsighted VC’s but we could NOT get the big US companies to buy – companies like Motorola, Intel, IBM – and so we turned to Japan.

And in doing so, I sought the help of my research colleagues in Japan. As luck would have it, Professor Uchida from Nagoya University and Director of IPP-Nagoya had become head of research at ULVAC in Japan. He and others really helped open doors for us. I remember spending an INTENSE week in Japan visiting 9 companies in 5 days.

The companies received us well and in the end we developed key partnerships with Canon and NEC. It was these partnerships that ultimately enable our semiconductor equipment company to grow and become successful. So it’s easy I hope to understand why I’ll be forever grateful to my friends and colleagues in Japan. Those relationships I

first made doing our university research proved to be critical to our ability to successfully translate our inventions into successful products.

In the last ten years, the adventure took another turn as I left UCLA and the startup company to become an academic leader - as Dean of the Jacobs School of Engineering at UC San Diego. This was a great challenge and one I'd tell you I couldn't even think about in 10 or 15 years earlier in my career. But the time at UC, San Diego and the Jacobs School of Engineering turned out to be a wonderful experience – hiring terrific faculty, helping to build programs, raising private funds to support the faculty and students, developing relationships with industry and building a great School of Engineering.

In my last year, two great things happened – the School received a \$100 M gift from Irwin and Joan Jacobs (Dr. Jacobs is the founder of Qualcomm, headquartered in San Diego) – and this gift is the largest gift ever given to a School of Engineering in the U.S. The second thing that happened is that the School of Engineering ended up tied for 10<sup>th</sup> in the nation with Cornell and Carnegie Mellon University in the 2003 rankings of the top engineering schools in the country.

With that, it seemed the right time to start the next adventure - Venture Capital. Now my aim is to help people like you when you believe you've developed a major invention and want to see it developed so it can be gotten out their into industry as a product.

This last part of my talk is just to familiarize you with Venture Capital. Since I remember years ago not really knowing what Venture Capital was all about, I thought I'd end with a brief introduction to what Venture Capital is, why it's important, and why one day it may be very important to you.

The remainder of this talk follows the powerpoint viewgraphs supplemental to this text.

# **NAE Japan-America Frontiers of Engineering Symposium**

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## **From Academia to Venture Capital Adventures in Engineering Research and Business**

**Robert W. Conn**

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**Enterprise Partners Venture Capital**

**La Jolla, CA**

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## **The Purpose of Venture Capital**

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- **Provide High-Risk Capital to Enable Innovations and Inventions, Often from Universities and Research Institutes, to Move from Concept to Commerce**
- **Create Large Economic Value for Founders, Management, Employees and Investors**
- **Build New Companies, Create Jobs, and Help Ensure Economic Growth and Long Term Economic Prosperity**

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## **Who Provides the Funds to VC Firms? And Why?**

### **A Range of Financial Institutions Provide Funds to VC Firms**

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- **Financial Firms – Fund-to-Funds**
- **Investment Banks**
- **Insurance Companies**
- **Pension Funds**
- **Private Foundations**
- **University Endowments**

**The Reason VC's are Funded is the  
Prospect of Higher Returns**

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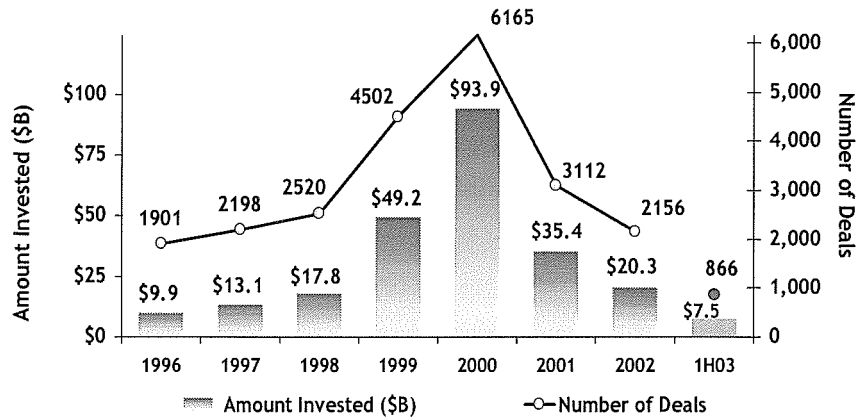
- **Financial Institutions Seek Higher Returns Relative to Other Investments such as Bonds, Publicly Traded Stocks and Real Estate – They Understand the Associated Higher Risk**
- **Generally, Not More than 5-10% of an Institution's Fund is Allocated to Venture Capital due to the Risks Involved**
- **Average Expected Returns are in the Range 20-25% Per Year (the IRR)**
- **The Average Time from First Investment in a Startup to Financial Return is About 4-5 Years**

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**How Much Money Is Invested by Venture  
Capital Firms Each Year Financing  
Private Companies at All Stages of Their  
Development?**

**And Geographically, Where in the U.S.  
Do They Put Their Money to Work?**

**Venture Capital Investments in 2003 Will Approach  
\$15 Billion – The Pre-Bubble Level of 1998**  
*Deal Flow and Equity into Venture-Backed Companies*



Underlying data available in VentureSource

Source: VentureOne/Ernst & Young

**VC Investments in Q3 2003 Totaled \$3.84 Billion**  
**Here's Where the Money is Put to Work**

<u>Region</u>	<u>VC Dollars Invested</u>	<u># of Companies Funded</u>
1. Silicon Valley	\$1,384,996,000	193
2. New England	\$692,261,000	106
3. Southern California (LA, OC, SD)	\$418,047,000	71
4. NY Metro	\$345,511,000	47
5. Southeast	\$294,756,000	50
6. Texas	\$275,901,000	38
7. DC/Metroplex	\$152,245,000	34
8. Midwest	\$148,014,000	33
9. Colorado	\$129,874,000	16

**California Retains the Overwhelming Lead in  
Receiving VC Investments – Receiving Fully  
Half of All Investment Dollars**

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**1. Silicon Valley                      \$1,385 Million**

**6. San Diego                      \$ 213 Million**

**7. Los Angeles & OC              \$ 204 Million**

**California's Entrepreneurial Infrastructure (including people), Its High Tech, Biotech and Entertainment Economy, Its Great Research Universities (the 10 UC Campuses plus CalTech, Stanford, and USC), and Its Strong Private Research Institutes (e.g., Salk, The Scripps Research Institute, and SRI) Yields a "Boiling Soup" of Inventiveness and Innovation**

**The "Other" Purpose of Venture  
Capital Is to Change the World!**

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**Biotechnology**

- Genetech
- Amgen
- Aguron (Pfizer)
- Applied Biosciences
- Biogen/Idec
- Chiron
- ...

**The Internet**

- Cisco
- Netscape
- AOL
- Amazon
- eBay
- Yahoo
- Google
- ...



## **The “Other” Purpose of Venture Capital Is to Change the World!**

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### Computing

- Sun Microsystems
- Compaq (Now HP)
- Dell
- Microsoft
- Oracle
- PeopleSoft
- ...

### Semiconductors

- Intel
- LSI Logic
- Applied Materials
- Lam Research
- Novellus
- Intersil (Wi-Fi)
- ...

## **The Economic Impact Of Venture-Backed Companies is Very Large**

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- **Jobs: 18% of Workers in the U.S. are at Companies that were Original Financed by Venture Capital**
- **Payroll: 24% of Payroll in the U.S. is From Companies that were Originally Financed by Venture Capital**
- **Implication – The Economic Impact of VC-Backed Companies is Large, and the Jobs Pay Quite Well**

## **So How Might Venture Capital Relate to You? -**

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- **When You Have a Discovery that Could  
Change the World, or Drive a Market  
Forward**
- **And You Want to Get that to People and in  
the Process Create Economic Value  
Consider Talking to a Venture Capitalist -  
He or She Might Just be Able to Help**

## **A Variety of Financial Institutions Provide the Funds to Venture Capital Firms**

**(Examples for EPVC )**

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- **Investment Banks and  
Financial Firms**
  - Adams Street Capital
  - HarbourVest
  - Horsley Bridge
  - J.P. Morgan
  - Knightsbridge
  - Pantheon
- **University Endowments**
  - Yale
  - Princeton
  - Columbia
  - CommonFund
- **Private Foundations**
  - Ford Foundation
- **Pension Funds**
  - GM, IBM, SBC,  
EDS, COPERA,  
Orange County

## Characteristics that Distinguish Types of Venture Capital Firms

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- **Size of Latest Fund**
  - Small (\$10-50M)
  - Medium (\$50-200M)
  - Large (\$200-500M)
  - Mega (>\$500 M)
- **Success and Age of Firm**  
(always highly correlated)
- **Company Stage at First Investment**
  - Early Stage (Startup)
  - Later Stage (Series B or Higher)
  - Mezzanine (prior to IPO)
  - Leveraged Buy Outs (LBO's)
- **Market Sector Diversification versus Specialization**
  - Information Technology -
    - (Semiconductors,
    - Networking and Communications
    - Telecom
    - Software
  - Biotech and Biomedical
  - Healthcare and Services
- **Geography of the Investments**
  - Regional Focus (e.g. West Coast and California)
  - National
  - International

## Characteristics of Enterprise Partners Venture Capital - An Example

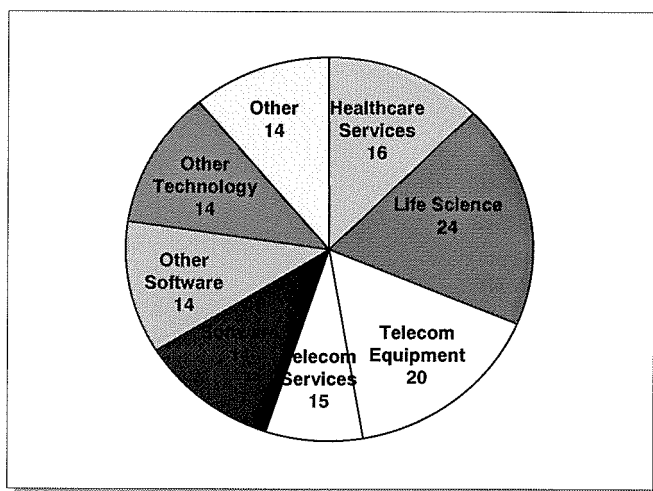
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- **Focus is on Early Stage Investments, But with Reserves for Later Rounds as Company Grows**
- **Partners have Domain Expertise and Experience in the Market Areas in Which We Invest**
- **Geographic Focus is West Coast, with a Strong Franchise in California**
- **Balanced Portfolio has been Achieved through Sector Diversification, Meaning Investments in Both IT and Biotech**
- **Firm was Founded in 1985 and is Investing from Funds EP V (\$310 M) and EP VI (\$355 M) – Its Age and Success are indeed Correlated**

**An Example of Sector Diversification for a Fund  
with a Regional Focus (West Coast)**

**EPVC has funded 127 Companies over the Past 20 Years**

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**Closing:**

So meetings what these, which bring together young American engineers with their counterparts in Japan, are wonderful and really important. I hope you too will have adventures as your careers evolve, and that connections you are making at meetings like this one might one day lead to a connection that moves you into unexplored territory -- and a great new adventure.