



NOVEMBER 6-7, 2009

HOT SPOTS

OF INVENTION
people, places, and spaces

A LEMELSON CENTER SYMPOSIUM AT THE NATIONAL MUSEUM OF AMERICAN HISTORY

THE JEROME AND DOROTHY LEMELSON CENTER FOR THE STUDY OF INVENTION AND INNOVATION

The Smithsonian's Lemelson Center is dedicated to exploring invention in history and encouraging inventive creativity in young people. The Center is supported by the Lemelson Foundation, a private philanthropy established by one of the country's most prolific inventors, Jerome Lemelson, and his family. The Lemelson Center is located in the National Museum of American History at 14th Street and Constitution Avenue, NW, Washington, DC. For more information, visit invention.smithsonian.org.

ACKNOWLEDGEMENTS

The Lemelson Center gratefully acknowledges the Lemelson Foundation and Draper Laboratory for their generous support of this year's New Perspectives on Invention and Innovation symposium and the *Hot Spots of Invention* showcase exhibition.

PHOTOS COURTESY OF:

MIT Museum; Intel Museum; Regis McKenna and the Department of Special Collections, Stanford University Libraries; Engines and Energy Conversion Laboratory; Dick Whittington; Remo Belli, Inc.; Medtronic, Inc.; Stony Brook University Special Collections

WELCOME

TO A HOT SPOT OF INVENTION!

We are delighted you have joined us for the Lemelson Center's New Perspectives on Invention and Innovation symposium. Since 1995 this annual event has brought together historians, practitioners, and a broad range of audiences to explore new avenues of inquiry into the history of invention and innovation.

This year's symposium – "Hot Spots of Invention: People, Places, and Spaces" – is especially significant. President Obama has placed a renewed emphasis on forming networks and partnerships among the academic community, public research institutions, educators, government agencies, and private entrepreneurs to establish and sustain a national culture of innovation – to make the whole country a "hot spot" of invention.

Our history is punctuated with hot spots of invention – areas where a critical mass of inventive people, networks, institutions, funding, and other resources converge and creativity flourishes. The Lemelson Center is deeply interested in the salient features of these innovative places and seeks to understand their key characteristics. The New Perspectives symposium and the opening of our showcase exhibition, *Hot Spots of Invention*, are just two examples of these efforts. The Center is also planning a major exhibition to explore this significant topic in exciting new ways.

We have learned that the search for knowledge and understanding is not an isolated enterprise. The Lemelson Center gratefully thanks our keynote speaker, Dr. Bradford Parkinson – co-winner of the 2003 Draper Prize – and the many scholars, inventors, and other practitioners who have graciously come forward to share their expertise during this symposium. We also acknowledge the Lemelson Foundation and Draper Laboratory for their support of this year's New Perspectives program. Finally, we thank you, the participants, for bringing your insights, interests, and questions to these activities.

Dr. Arthur Molella

Jerome and Dorothy Lemelson Center Director

APPLE CO-FOUNDER STEVE JOBS AND INTEL CO-FOUNDER ROBERT NOYCE



HOT SPOTS OF INVENTION

THIS YEAR'S SYMPOSIUM THEME

The Lemelson Center's New Perspectives on Invention and Innovation symposium establishes a dialogue between the past and the future. This year's theme, "Hot Spots of Invention," builds on more than a decade of research and public programs at the Lemelson Center, exploring the powerful historical interplay of people, places, resources, and ideas in shaping inventors' work.

From individual workshops to large geographical regions, from Edison's Menlo Park laboratory to Silicon Valley, both scholars and the public have long been curious about inventors and the physical spaces and places that foster invention and innovation, what we're calling "Hot Spots of Invention."

There are so many questions to explore:

- ① Why do particular places or regions become known as centers of invention?
- ① What are the technological, economic, geographic, political, cultural, and sociological factors that spark the creation of hot spots?
- ① Do these factors vary over time and geographic location?
- ① What is the role of the inventor and why do innovative people gravitate to these places?
- ① Why does one place succeed while another one fails?

people

Discussing the influence of charismatic individuals on the region in which they live and work.



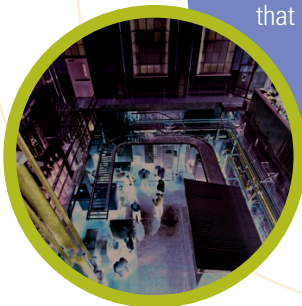
places

Looking at the evolution of innovative regions and the factors that led to their creation and, in some cases, their eventual decline.



spaces

Investigating the specific locations, laboratories, and workshops that inventors establish to suit their creative needs.



OPENING NIGHT

FRIDAY, NOVEMBER 6, 2009

HOT SPOTS OF INVENTION SHOWCASE EXHIBITION

Grand Opening (First Floor West)

Invention happens everywhere. But sometimes a hot spot of invention takes shape when the right mix of creative people, resources, and inspiring surroundings come together. In the 1930s, a hot spot began to form among the industrial labs and universities of New England. As World War II neared, the hot spot matured at the Massachusetts Institute of Technology. The *Hot Spots of Invention* showcase exhibit highlights how three war-era labs helped transform Cambridge, Massachusetts into a dynamic place of invention.

7:45 pm

KEYNOTE ADDRESS

Carmichael Auditorium (First Floor)

Dr. Bradford Parkinson, a co-winner of the 2003 Draper Prize for the concept and development of the Global Positioning System (GPS), opens the symposium with his insights on "Tracing the Origins of GPS."

GPS is now a worldwide utility. More than 500 million people take for granted knowledge of position in real time. How did GPS come about? What centers of knowledge and innovation contributed to building the system?

Dr. Parkinson will highlight the number one innovation that enabled GPS, as well as the five major barriers to original success, and he will offer general conclusions on sources of invention and innovation based on the GPS experience.

"DOC" DRAPER IN THE MIT AERO ENGINE LABORATORY



TECHNICIANS WORKING IN THE RAD LAB AT MIT

SYMPOSIUM SCHEDULE

SATURDAY, NOVEMBER 7, 2009

Carmichael Auditorium (First Floor)

9:30 am

OPENING REMARKS

A welcome by Dr. Arthur Molella,
Jerome and Dorothy Lemelson Center Director



EARL BAKKEN IN THE MEDTRONIC GARAGE, MINNEAPOLIS, MINNESOTA

Hot Spots of Invention: Places

9:45 am

"MEDICAL ALLEY": THE RISE OF THE MINNESOTA MEDICAL DEVICE INDUSTRY

Dr. David Rhees, Executive Director of the Bakken Museum

From the iconic garage, Earl Bakken and his brother-in-law, Palmer Hermundslie, launched the medical device industry in Minnesota with the founding of Medtronic in 1949 and Bakken's 1957 invention of the wearable cardiac pacemaker. Medtronic's success served as a catalyst for developing "Medical Alley," a still-thriving hot spot of major medical technology companies in the region.

HOLLYWOOD: A PLACE FOR DREAMS

Dwight Bowers, Curator of Music, Sports, and Entertainment, National Museum of American History (NMAH)
Dr. Katherine Ott, Curator of Medicine and Science, NMAH
Ryan Lintelman, Project Assistant in Information Technology and Communications, NMAH

Moviemakers transformed Hollywood into a hot spot of invention as the film industry developed innovations to tell – and sell – its stories. From editing tricks to Technicolor to makeup that could withstand hot lights and close-ups, Hollywood moviemakers continuously pushed technological boundaries, even beyond movie-making.

ROBERT NOYCE, CO-FOUNDER OF INTEL



Hot Spots of Invention: People

EDISON IN HIS PRIVATE EXPERIMENTAL ROOM



11:30 am

ROBERT NOYCE AND SILICON VALLEY INNOVATION

Dr. Leslie Berlin, Project Historian for the Silicon Valley Archives, Stanford University

Robert Noyce co-invented the microchip, co-founded Intel and Fairchild Semiconductor, and mentored dozens of entrepreneurs including Apple's Steve Jobs. Considered the Thomas Edison *and* Henry Ford of Silicon Valley, he played an innovative role in the growth of the region.

THE ROLE OF PLACE IN THOMAS EDISON'S INVENTIVE CAREER

Dr. Paul Israel, Director and General Editor for the Thomas A. Edison Papers, Rutgers University

Before settling down in New Jersey, Thomas Edison encountered a range of work environments as a telegrapher and inventor. These early experiences directly influenced the creation of his "invention factory" at Menlo Park and later West Orange laboratory where he carried out his most important work.

Hot Spots of Invention: Spaces

1:45 pm

THE ARCHITECTURE OF HEALING: RE-ENVISIONING MEDICAL INNOVATION AT JOHNS HOPKINS, NIH, AND STONY BROOK

Dr. Stuart W. Leslie, Professor of the History of Science and Technology, Johns Hopkins University

The Stony Brook Health Sciences Center, the National Institute of Health's Clinical Center, and the Armstrong Building at the Johns Hopkins School of Medicine represent three approaches to redesigning spaces of medical education and clinical practice for the purpose of bringing basic biomedical research from the laboratory to the bedside.

THE POWER OF THE POWER PLANT AS PLACE: HOW RENOVATION LED TO INNOVATION

Dr. Bryan Willson, Inventor, and Director of the Engines and Energy Conversion Laboratory at Colorado State University

How does an abandoned Colorado power plant grow into an internationally known energy solutions organization, with diverse research ranging from industrial engines to clean cookstoves to algae biofuels? The Engines and Energy Conversion Laboratory building's history and rebirth have allowed it to play a crucial role in inspiring innovation on a global scale.



STONY BROOK HEALTH SCIENCES CENTER

3:15 pm

SYNTHESIS AND CONCLUSIONS

Dr. David Hounshell, David M. Roderick Professor of Technology and Social Change, Carnegie Mellon University, offers his synthesis and conclusions on the symposium's themes.



10:00 am
to 4:00 pm

MAKE YOUR OWN DRUM!

(First Floor West)

Visitors to Spark!Lab construct their own drums out of recyclable materials and join in facilitated mini drum circles at 11:30 a.m., 1:00 p.m., and 2:30 p.m.

ADDITIONAL PROGRAMS

4:00 pm

INNOVATIVE LIVES: REMO BELLI WITH KEN KIMERY

Carmichael Auditorium (First Floor)

What do the Beatles, DuPont, and Mickey Rooney have in common? Remo Belli. Considered by many to be the “father of the modern drumhead,” Remo Belli revolutionized the music-products industry by perfecting the first practical synthetic drumhead – “WeatherKing.”

In a conversation with Ken Kimery, Executive Producer of the Smithsonian Jazz Masterworks Orchestra, Belli retraces his development of the synthetic drumhead and its global impact. In discussing his experiences as a musician in 1940s Los Angeles and the Hollywood hot spot, he highlights how his community of fellow musicians led to his innovations and inventions in the making of percussion instruments.



REMO BELLI. “FATHER OF THE MODERN DRUMHEAD”

5:00 pm

DRUM CIRCLE WITH REMO BELLI

Flag Hall (Second Floor)

Join our drum circle! It’s easy, it’s fun, and it’s for you, your friends, and your whole family! No experience is necessary and we’ll provide the hand drums, shakers, tambourines, and lots of other fun percussion. And you are welcome to bring your own instruments. This is an experience you won’t want to miss!

In the words of percussionist Arthur Hull, “The Community Drum Circle is a fun, entry-level learning experience that is accessible to anyone who wants to participate. Participants express themselves collectively by using a chorus of tuned drums, percussion, and vocals to create a musical song together while having a great time.”

2009 SYMPOSIUM

→ FRIDAY, NOVEMBER 6, 2009

OPENING NIGHT EVENTS

7:45 pm

Symposium Keynote Address

Dr. Bradford Parkinson, Stanford University
2003 Draper Prize co-winner for his work in developing GPS
Carmichael Auditorium (First Floor)

→ SATURDAY, NOVEMBER 7, 2009

HOT SPOTS OF INVENTION SYMPOSIUM SESSIONS

9:30 am

Symposium Opening Remarks

Carmichael Auditorium (First Floor)

9:45 am

Hot Spots of Invention: Places

Carmichael Auditorium (First Floor)

11:30 am

Hot Spots of Invention: People

Carmichael Auditorium (First Floor)

1:45 pm

Hot Spots of Invention: Spaces

Carmichael Auditorium (First Floor)

3:15 pm

Symposium Synthesis and Conclusions

Carmichael Auditorium (First Floor)

ADDITIONAL PROGRAMS

4:00 pm

Innovative Lives: Remo Belli with Ken Kimery

Carmichael Auditorium (First Floor)

5:00 pm

Drum Circle with Remo Belli

Flag Hall (Second Floor)





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