

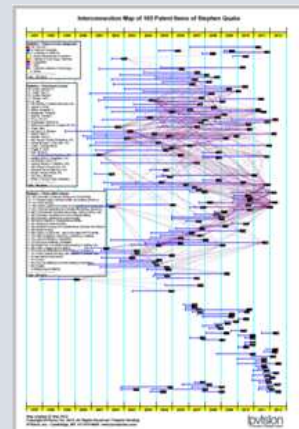
Lemelson-MIT Prize 2013

Report on Patent Portfolio of Angela Belcher

For: Lemelson-MIT Program

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IPVision
Patent Interconnection Map

Lemelson-MIT Prize 2013

Report on Patent Portfolio of Angela Belcher For: Lemelson-MIT Program

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DATA LIMITATIONS; ERRORS: IPVision has prepared this report from information which to the best of our knowledge is complete and accurate. NOTE: Electronic data from the United States Patent and Trademark Office is not available for patents issued prior to 1976. IPVision makes NO REPRESENTATIONS OR WARRANTIES as to this Report's completeness, accuracy or fitness for any purpose. If you find any errors in this Report please notify IPVision and we will rerun this report with corrected data if possible.

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Access to the *See-the-Forest*TM

Where there are Live Links in this report simply click on the Link and it will take you to the specific document stored at the *See-the-Forest*TM Patent Analytics website.

Important Note About Data. The analyses presented in this Report were based on data as of June 18, 2013 – i.e., the patents listed for a given company represent patents owned of record as shown at the U.S. Patent and Trademark Office databases as of that date. Patents issued to, acquired by or disposed of by such a company after June 18, 2013 will not appear in the list of patents shown in this Report or on *See-the-Forest*TM. However, patents that issue after June 18, 2013 that cite a patent shown in an analysis in this Report will appear in any citation analysis run after June 18, 2013 on the information stored on *See-the-Forest*TM. In such a case there will be an inconsistency between the results presented in this Report (which is a snapshot in time) and the results shown on *See-the-Forest*TM.

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1. THE LEMELSON-MIT PRIZE

"The \$500,000 Lemelson-MIT Prize recognizes individuals who translate their ideas into inventions and innovations that improve the world in which we live.

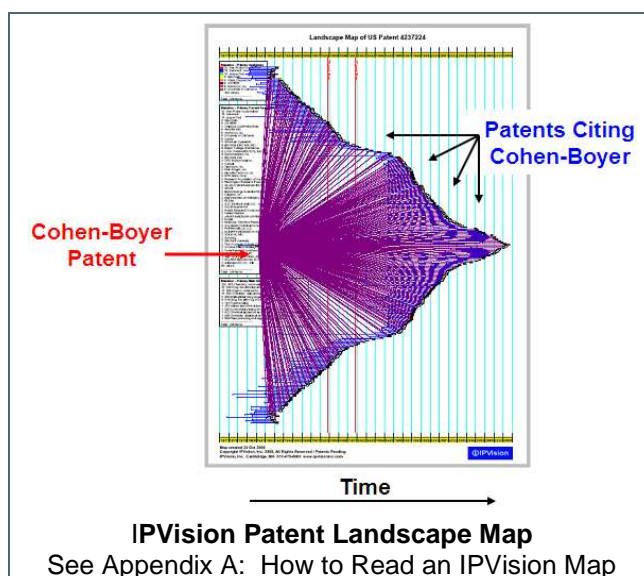
Dubbed the "Oscar for Inventors," the Lemelson-MIT Prize is awarded to outstanding mid-career inventors, who have developed a patented product or process of significant value to society, which has been adopted for practical use, or has a high probability of being adopted. By recognizing and funding younger, mid-career inventors, the prize is designed to spur inventive careers and provide role models for future generations of inventors." Source: [Lemelson-MIT Program Website](#)

2. OBJECTIVE MEASURES OF INNOVATION

One measure of the importance of an invention is the extent to which others in the field cite that invention in research papers. See for example, [Web of Science Citation Indices](#).

Patents are another form of evidence of the value of an innovation and the broadness of the commercial or societal adoption of that invention. In order to obtain a patent the inventor must show that his or her invention is "novel". Relevant prior art known to the inventor must be cited in the patent examination process. A patent can become unenforceable if an applicant knowingly fails to cite relevant prior patent art of which he or she is aware. Accordingly, patent citations or the lack thereof have more specific economic consequences than citations of work in research papers

High Patent Citation is Evidence of Value. Many major innovations that have been patented have been highly cited by other patents. The IPVision Patent Landscape Map shown to the right is of the Cohen-Boyer gene splicing patent that launched the Biotech Industry. Stanley Cohen and Herbert Boyer were [Co-Recipients of the Lemelson-MIT Prize in 1996](#). Stanford University received over \$250m in revenue from the licensing of this patent. This patent U.S. 4,237,224 "Process for producing biologically functional molecular chimeras" had been cited over 270 times as of December 2009.



Caveat: Although high patent citation is strong evidence of the value of an innovation, this evidence must be considered relative to the age of the technology, - i.e., the time it takes for the innovation to be recognized by others. The speed of technological development in a field must also be considered.

3. ANGELA BELCHER PATENT PORTFOLIO

[Dr. Angela Belcher](#) is the W.M. Keck Professor of Energy in Materials Science and Biological Engineering at M.I.T. and a faculty member at the [David H. Koch Institute for Integrative Cancer Research](#) at MIT. She received a B.A. in Creative Studies (1991) and a PhD in Chemistry (1997) from the University of California, Santa Barbara. She was a member of the faculty at the University of Texas, Austin from 1999 to 2002 and joined the faculty of M.I.T. in 2002. Dr. Belcher heads the [Biomolecular Materials Group](#) at M.I.T. which uses advanced bioengineering techniques to explore the interface between inorganic and organic materials for applications to energy, medicine, electronics, nanomechanics, and the environment.

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The focus of Prof. Belcher's research is understanding and using the process by which nature makes materials in order to design novel hybrid organic-inorganic electronic and magnetic materials on new length scales. She then uses these materials in applications as varied as solar cells, batteries, medical diagnostics and basic single molecule interactions related to disease. Her research is highly interdisciplinary and brings together the fields of inorganic chemistry, materials chemistry, biochemistry, molecular biology and electrical engineering.

An animated presentation of Prof. Belcher's life story can be viewed at:
http://www.lawrencehallofscience.org/nanozone/tn/thenow_belcher.htm

As of June 2013 Dr. Belcher had [11 issued U.S. patents](#) and [37 published pending U.S. patent applications](#) (the "Belcher Patents"). Her top 5 most highly cited patents are:

Top 5 Most Highly Cited Patents of Angela Belcher				
Patent #	Inventors	Title	Citations By (BCs)	Citations To (FCs)
7332321	Belcher, Angela M.;Lee, Seung-Wuk	Viral fibers	20	4
7488593	Belcher, Angela M.;Peelle, Beau;Nam, Ki Tae	Multifunctional biomaterials as scaffolds for electronic, optical, magnetic, semiconducting, and biotechnological applications	26	3
7374893	Belcher, Angela M.;Reiss, Brian D.;Mao, Chuanbin;Solis, Daniel J.	Peptide mediated synthesis of metallic and magnetic materials	44	2
7598344	Belcher, Angela M.;Schmidt, Christine J.;Miller, Kiley P. H.;Sanghvi, Archit	Composition, method and use of bi-functional biomaterials	24	2
7960721	Belcher, Angela;Hu, Evelyn;Quan, Xina;Pakbaz, Hash	Light emitting devices made by bio-fabrication	14	2

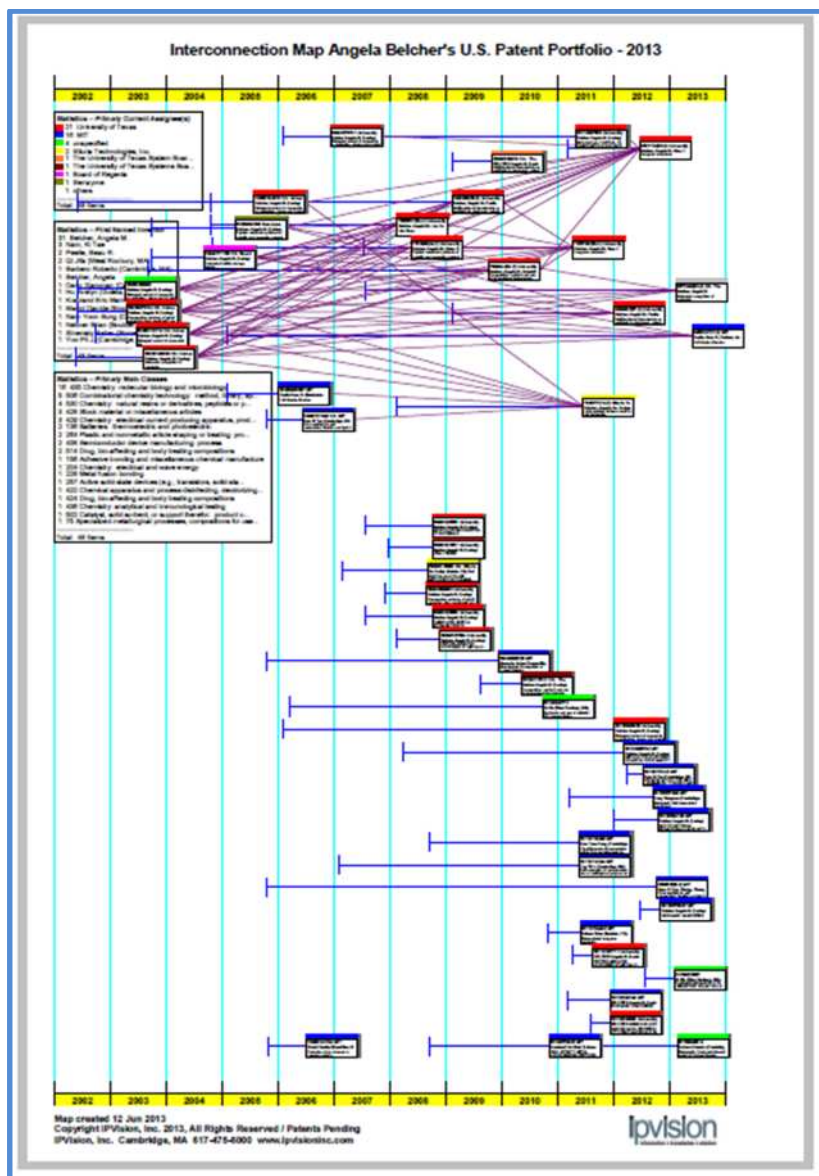
View Patents on *See-the-Forest*™ ► [Link to List](#)

3.1 BELCHER PATENT PORTFOLIO MAP

The following is an IPVision [Patent Interconnection Map](#)™ showing the patent citation relationships among the 48 U.S. patent properties (11 issued U.S. patents and 37 published pending U.S. applications) of Dr. Angela Belcher:

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Patent Citation Interconnection Map™ of Dr. Angela Belcher



Statistics -- Primary Current Assignee(s)

- 21 University of Texas
- 16 MIT
- 4 unspecified
- 2 Siluria Technologies, Inc.
- 1 The University of Texas System Board of Regents
- 1 The University of Texas Systems Board of Regents
- 1 Board of Regents
- 1 Semzyme
- 1 others

Total: 48 Items

Patent Citation Interconnection Map™:

This IPVision Patent Citation Interconnection Map™ shows the U.S. patent properties of Dr. Angela Belcher on a timeline from left to right.

Each box on the map is an issued U.S. patent or a published pending U.S. patent application. The left edge of each box is aligned with the patent issue date (in the case of issued patents) or the publication date (in the case of published applications). The "tails" to the left of each box shows the filing date. The lines connecting the boxes are the "patent citation references" among the patent properties shown. [How to Read an IPVision Patent Map.](#)

To view an Interactive Map - Click on the Map image or the "Link to Map" text below.

OBSERVATION: The high number of cross citations shown in the upper portion of this map is usually indicative of high value, with extension patents building on earlier core work.

Note: For information about Reading IPVision Maps, see Appendix A

[View Live IPVision Map™](#) ▶

[Link to Map](#)

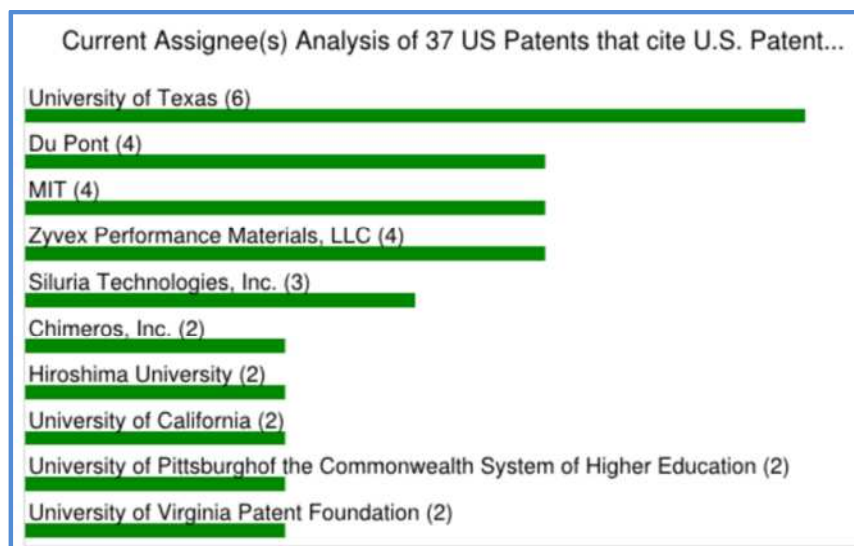
3.2 PATENTS CITING THE BELCHER PATENTS

The Belcher Patents are cited by 37 other U.S. patents as prior patent art ("Forward Citation Patents").

[View "List of Forward Citation Patents" on See-the-Forest™](#) ▶ [Link to List](#)

According to the U.S. Patent and Trademark Office records, the Top 10 Current Assignee/Owners of the Forward Citation Patents are:

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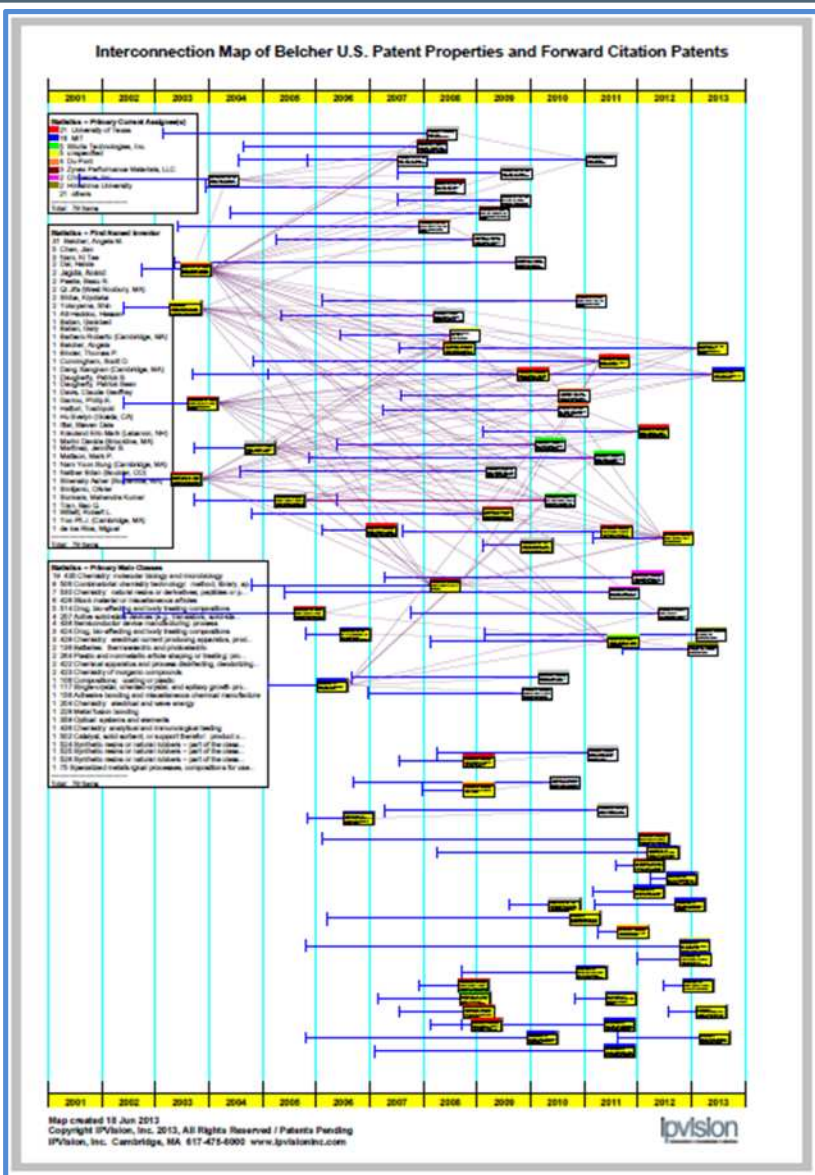
View “Forward Citation Assignee Analysis™” on *See-the-Forest™* ► [Link to Analysis](#)

3.3 BELCHER FORWARD CITATION PATENT LANDSCAPE MAP

The following is an IPVision Forward Citation Patent Landscape Map™ showing the 48 U.S. patent properties of Dr. Belcher and the other U.S. patents that cite the Belcher Patents (“Forward Citation Patents” or “FCs”) as of the date of this report:

Lemelson-MIT Prize 2013 Report on Patent Portfolio of Angela Belcher

Forward Citation Patent Landscape Map™ of Belcher Patents



Statistics -- Primary Current Assignee(s)

- 21 University of Texas
- 16 MIT
- 5 Siluria Technologies, Inc.
- 5 unspecified
- 4 Du Pont
- 3 Zyvex Performance Materials, LLC
- 2 Chimeros, Inc.
- 2 Hiroshima University
- 21 others

Total: 79 Items

Forward Citation Patent Landscape Map™: This IPVision Forward Citation Patent Landscape Map™ shows the 48 Belcher U.S. patent properties on a timeline from left to right. The Belcher patents are shaded in yellow. To the right of the Belcher patents are the Forward Citation Patents that cite the Belcher patents as “prior patent art”. The Current Assignee/Owners of these patents are color coded as shown in the legend above.

To view an Interactive Map - Click on the Map image or the “Link to Map” text below.

[How to Read an IPVision Patent Map.](#)

Note: For information about Reading IPVision Maps, see Appendix A

[View Live IPVision Map™](#) ▶

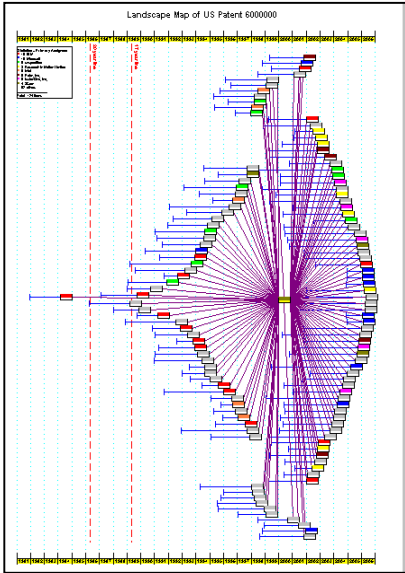
[Link to Map](#)

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APPENDICES AND EXHIBITS

APPENDIX A – HOW TO READ AN IPVISION MAP

An IPVision Map is a visual representation of the relationships between objects. The following is an example of a Landscape Map for a single U.S. Patent:



This Landscape Map is of U.S. Patent 6,000,000 entitled “Extendible method and apparatus for synchronizing multiple files on two different computer systems”. It is the basic patent for the Palm Pilot software.

The horizontal X axis is “time”

Patent 6000000 is in the middle of the “fan”. The lines going backward (to the left) are the patents cited by Patent 6000000 and the lines going forward (to the right) show the patents which cite Patent 6000000.

The details of an IPVision Map are explained in more detail below

