

## Bilski v. Kappos

Supreme Court Faculty Lunch  
University of North Carolina School of Law  
July 1, 2010

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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Slide 1

## The Supreme Court on Software Patents

Gottschalk v. Benson (1972)  
Parker v. Flook (1976)  
Diamond v. Diehr (1981)  
Bilski v. Kappos (2010)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## The Supreme Court on Business Method Patents

Bilski v. Kappos (2010)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Bilski/Warsaw's Patent Application

1. A method for managing the consumption risk costs of a commodity sold by a commodity provider at a fixed price comprising the steps of:
  - (a) initiating a series of transactions between said commodity provider and consumers of said commodity wherein said consumers purchase said commodity at a fixed rate based upon historical averages, said fixed rate corresponding to a risk position of said consumer;
  - (b) identifying market participants for said commodity having a counter-risk position to said consumers; and
  - (c) initiating a series of transactions between said commodity provider and said market participants at a second fixed rate such that said series of market participant transactions balances the risk position of said series of consumer transactions.

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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Andrew Chin  
chin@unc.edu  
AndrewChin.com



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Andrew Chin  
chin@unc.edu  
AndrewChin.com



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Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Using the Invention

- Households' electricity bills range from \$60 to \$100
- Utility company offers households a flat rate of \$80
  - Generator's revenue ranges from \$6 to \$10 million
  - Utility company offers generator a flat rate of \$8 million

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Objections

- Business method
- Fails "machine-or-transformation" test
- Abstract idea

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Objections

- Business method — 4 (Stevens)
- ~~Fails "machine-or-transformation" test~~
- Abstract idea — 5 (Kennedy)

Held unpatentable

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## U.S. Const., Art. I, § 8, cl. 8

The Congress shall have Power ...  
To promote the Progress of Science and **useful Arts**, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries;

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## 35 U.S.C. § 101

Whoever invents or discovers any new and useful **process, machine, manufacture, or composition of matter**, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Judicial Exceptions to § 101

“It is a commonplace that **laws of nature, physical phenomena, and abstract ideas** are not patentable subject matter.

“A patent could not issue, in other words, on the law of gravity, or the multiplication tables, or the phenomena of magnetism, or the fact that water at sea level boils at 100 degrees centigrade and freezes at zero — even though newly discovered.”

— Parker v. Flook (1978)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Another Judicial Exception?

“[A]lthough a process is not patent-ineligible simply because it is useful for conducting business, a claim that merely describes a **method of doing business** does not qualify as a ‘process’ under § 101.”

— Justice Stevens, concurring

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Stevens on Business Method Patents

- Textual interpretation of “process” may be limited by accompanying categories of “machine, manufacture and composition of matter” to technological processes
- Framers’ understanding of “useful Arts” was limited to industrial, mechanical and manual arts
- Before State Street Bank (Fed Cir. 1998), U.S. had long history of innovation in business methods without patents
- Competitive advantage is enough to motivate innovation in business methods
- Business method patents are vague, chill business activity and stifle competition

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## 35 U.S.C. § 100(b)

The term “**process**” means process, art, or **method**, and includes a new use of a known process, machine, manufacture, composition of matter, or material.

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Another Judicial Exception?

“Any suggestion in this Court’s case law that the Patent Act’s terms deviate from their **ordinary meaning** has only been an explanation for the exceptions for laws of nature, physical phenomena, and abstract ideas....

“The court is unaware of any argument that the ‘ordinary, contemporary, common meaning’ of ‘method’ excludes business methods.”

— Justice Kennedy, majority

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## 35 U.S.C. § 273(a)(3) & (b)(1)

(b)(1) It shall be a defense to an action for infringement ... with respect to any subject matter that would otherwise infringe one or more claims for a **method ...** if such person had, acting in good faith, actually reduced the subject matter to practice at least 1 year before the effective filing date of such patent, and commercially used the subject matter before the effective filing date of such patent.

(a)(3) [T]he term **“method”** means a method of doing or conducting business ...

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Objections

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- Fails **“machine-or-transformation”** test
- Abstract idea

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## In re Bilski (Fed. Cir. 2008) (en banc)

A process is patent-eligible if:

- (1) it is tied to a particular machine or apparatus, or
- (2) it transforms a particular article into a different state or thing.”

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Another Judicial Exception?

“Any suggestion in this Court’s case law that the Patent Act’s terms deviate from their ordinary meaning has only been an explanation for the exceptions for **laws of nature, physical phenomena, and abstract ideas.**”

— Justice Kennedy, majority

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Another Judicial Exception?

“Any suggestion in this Court’s case law that the Patent Act’s terms deviate from their ordinary meaning has only been an explanation for the exceptions for **laws of nature, physical phenomena, and abstract ideas.**”

— Justice Kennedy, majority

**But judicial exceptions aren’t as strict as they first seem...**

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Benson’s Claim 8

8. The method of converting signals from binary coded decimal form into binary which comprises the steps of—

- (1) storing the binary coded decimal signals in a reentrant shift register,
- (2) shifting the signals to the right by at least three places, until there is a binary ‘1’ in the second position of said register,
- (3) masking out said binary ‘1’ in said second position of said register,
- (4) adding a binary ‘1’ to the first position of said register,
- (5) shifting the signals to the left by two positions,
- (6) adding a ‘1’ to said first position, and
- (7) shifting the signals to the right by at least three positions in preparation for a succeeding binary ‘1’ in the second position of said register.

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Preemption

Gottschalk v. Benson (1972)

“[The patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.]”

Parker v. Flook (1976)

Diamond v. Diehr (1981)

Bilski v. Kappos (2010)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Preemption

Gottschalk v. Benson (1972)

Parker v. Flook (1976)

**Field-of-use restrictions and insignificant post-solution activity do not distinguish this case from *Benson***

Diamond v. Diehr (1981)

Bilski v. Kappos (2010)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Preemption

Gottschalk v. Benson (1972)

Parker v. Flook (1976)

Diamond v. Diehr (1981)

“Their process admittedly employs a well-known mathematical equation, *but they do not seek to pre-empt the use of that equation.* Rather, they seek only to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process.”

Bilski v. Kappos (2010)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## In re Bilski (Fed. Cir. 2008) (en banc)

“The Supreme Court ... has enunciated a definitive test to determine whether a process claim is tailored narrowly enough to encompass only **a particular application** of a fundamental principle rather than to **preempt the principle itself.**”

*Benson + Flook + Diehr = ...*

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## A “Clue” from *Benson*

“Transformation and reduction of an article ‘to a different state or thing’ is the clue to the patentability of a process claim that does not include particular machines.”

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## In re *Bilski* (Fed. Cir. 2008) (en banc)

A process is patent-eligible if:

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or
- (2) it transforms a particular article into a  
different state or thing.”

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## *Bilski v. Kappos*: Questions Presented

- Whether the Federal Circuit erred by holding that a “process” must satisfy the “machine-or-transformation” test despite Supreme Court precedent declining to limit patent eligibility beyond exclusions for “laws of nature, physical phenomena, and abstract ideas”
- Whether the “machine-or-transformation” test contradicts Congressional intent allowing patents for “method[s] of doing or conducting business” [§ 273]

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## *Benson*’s “Clue” Is Not A Test...

“Any suggestion in this Court’s case law that the Patent Act’s terms deviate from their **ordinary meaning** has only been an explanation for the exceptions for laws of nature, physical phenomena, and abstract ideas....

— Justice Kennedy, majority

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## But It Is A Clue

Application of this test, the so-called ‘machine-or-transformation test,’ has thus repeatedly helped the Court to determine what is ‘a patentable “process.”’

— Justice Breyer, concurring

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## But It Is A Clue

Application of this test, the so-called ‘machine-or-transformation test,’ has thus repeatedly helped the Court to determine what is ‘a patentable “process.”’

— Justice Breyer, concurring

Safe harbor

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Preemption

Process claims

substantially all practical applications

Fewer limitations (more abstract)

More limitations (more applied)

Andrew Chin  
chin@unc.edu  
AndrewChin.com

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## Machine-or-Transformation

Process claims

Implemented by a particular machine

Particularly transforms a particular article

Meaningful limits on claim scope

Andrew Chin  
chin@unc.edu  
AndrewChin.com

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

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Process claims

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Meaningful limits on claim scope

Safe harbor

Andrew Chin  
chin@unc.edu  
AndrewChin.com

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

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## Field-of-Use Limitations

Process claims

fields of use

Andrew Chin  
chin@unc.edu  
AndrewChin.com

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

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## Insignificant Extrasolution Activity

Process claims

purposes

Andrew Chin  
chin@unc.edu  
AndrewChin.com

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

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## Objections

- Business method patent
- Fails “machine-or-transformation” test
- Abstract idea

Andrew Chin  
chin@unc.edu  
AndrewChin.com

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

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## Interpreting the Claim

Claim 1 “explain[s] the basic concept of hedging, or protecting against risk: ‘Hedging is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class.’ ... The concept of hedging, described in claim 1 ... is an unpatentable abstract idea, just like the algorithms at issue in *Benson* and *Flook*.”

— Justice Kennedy, majority  
(citing Judge Rader’s dissent in *In re Bilski*)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Interpreting the Claim

“Allowing petitioners to patent risk hedging would preempt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea.”

— Justice Kennedy, majority  
(citing Judge Rader’s dissent in *In re Bilski*)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Bilski/Warsaw’s Patent Application

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Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Intrepreting the Claim

The Court “discounts the application’s discussion of what sorts of data to use, and how to analyze those data...”

— Justice Stevens, concurring

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Interpreting the Claim

“In other words, the Court artificially limits [*sic*] petitioners’ claims to hedging, and then concludes that hedging is an abstract idea rather than a term that describes a category of processes including petitioners’ claims.”

— Justice Stevens, concurring

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Intrepreting the Claim

“The Court, in sum, never provides a satisfying account of what constitutes an unpatentable abstract idea.... The Court essentially asserts its conclusion that petitioners’ application claims an abstract idea. This mode of analysis (or lack thereof) may have led to the correct outcome in this case, but it also means that the Court’s musings on this issue stand for very little.”

— Justice Stevens, concurring

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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### Law Professors' Amicus Briefs

- Lemley + 19 law and business professors
- Sarnoff + 10 law professors + AARP

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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### Bilski v. Doll: Lemley amicus

The Court should “maintain the rule that patents are available for ‘anything under the sun made by man,’ including discoveries of ideas, laws of nature, or natural phenomena so long as they are **implemented in a practical application.**”

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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### Bilski v. Doll: Sarnoff amicus

To be patentable, “the invention (i.e., the creative, technological advance) must **reside in the [practical] application**, rather than in a discovery [of a fundamental principle] preceding or employed by it.”

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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### Bilski v. Doll: Sarnoff amicus

“This is because the science, nature, or ideas must be treated as if they are already in the prior art, i.e., are publicly known and free for all to use.  
“Absent invention in applying such discoveries, there is simply no invention to patent.”

Andrew Chin  
chin@unc.edu  
AndrewChin.com

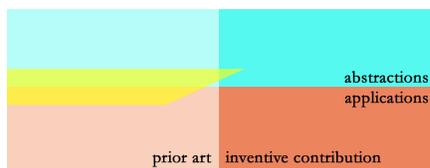


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### Bilski v. Doll: Lemley amicus

Process and product claims



Andrew Chin  
chin@unc.edu  
AndrewChin.com



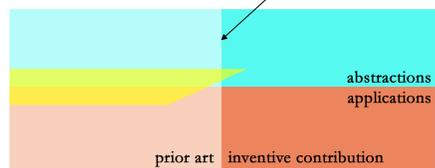
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### Bilski v. Doll: Lemley amicus

Process and product claims

Nonobviousness standard?



Andrew Chin  
chin@unc.edu  
AndrewChin.com



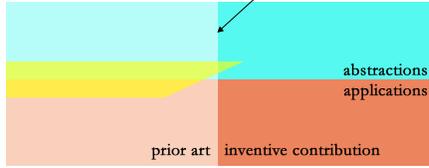
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## Bilski v. Doll: Lemley amicus

Process and product claims

*How hard was the math?*



Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## How Hard Was the Math?

“There is nothing to suggest that ... one of ordinary mathematical skill armed with the Taylor reference would be able to discover the simpler equations which are the basis of the claimed programming.

“Accordingly, we conclude that claim 19 as a whole defines an invention which is not obvious in view of the prior art.”

—In re Bernhardt, 417 F.2d 1395, 1402 (C.C.P.A. 1969)

Andrew Chin  
chin@unc.edu  
AndrewChin.com

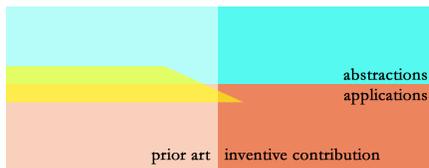


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## Bilski v. Doll: Sarnoff amicus

Process and product claims



Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## What is an “Application”?

- A mathematical transformation of the law of nature specifically adapted to solving a particular problem?
- A use of the law of nature that addresses a practical problem?

- Practical = Physical?

**What about machine claims?**

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Mechanical computers

1848

1948



Past

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Mechanical computers

1848

1948

2007



Past

Future

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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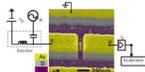
## Machines that do math



Past



Present



Future

Andrew Chin  
chin@unc.edu  
AndrewChin.com

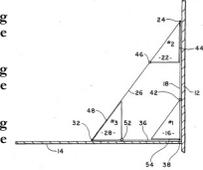
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at CHAPEL HILL

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## U.S. Patent 4,575,943 (issued 1986)

1A. An angle measuring apparatus comprising:  
three tape measures each having a housing and a tape extending therefrom;  
the tape of the first of said tape measures being connected to the housing of said second tape measure;  
the tape of said second tape measure being connected to the housing of said third tape measure; and  
the tape of said third tape measure being connected to the housing of said first tape measure;  
said tape measures being adjustable such that the indicia output on each are identical when said apparatus indicates a right triangle.



Andrew Chin  
chin@unc.edu  
AndrewChin.com

THE UNIVERSITY  
of NORTH CAROLINA  
at CHAPEL HILL

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## A fundamental tool of geometry



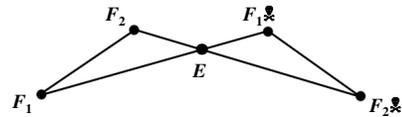
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chin@unc.edu  
AndrewChin.com

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of NORTH CAROLINA  
at CHAPEL HILL

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## Yates's Theorem (1931)



Given:  $F_1 F_2 = F_1' F_2'$  and  $F_1 F_1' = F_2 F_2'$ .  
Then:  $\triangle F_1 F_2 F_2' \cong \triangle F_2' F_1' F_1$  (SSS), so  $\angle F_1 F_2' F_2 \cong \angle F_2' F_1 F_1'$ , and  $\triangle F_1 F_2 E \cong \triangle F_2' F_1' E$  (SAS).  
Thus  $F_2 E = F_1' E$ , and  $F_1 E + F_2 E = F_1 E + F_1' E = F_1 F_1'$ .  
 $\therefore$  If  $\overline{F_1 F_2}$  is held fixed, then  $E$  traces an ellipse.

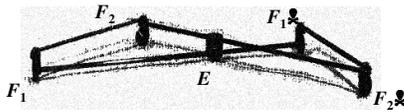
Andrew Chin  
chin@unc.edu  
AndrewChin.com

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of NORTH CAROLINA  
at CHAPEL HILL

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## Yates's linkage for drawing ellipses (1931)



"Upon the suggestion of Professor Frank Morley, a mechanical device ... was made that will exhibit a fairly large portion of each curve."



Andrew Chin  
chin@unc.edu  
AndrewChin.com

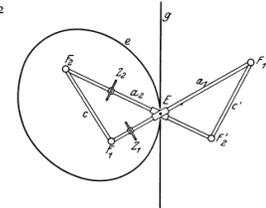
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## Hilbert's "peculiar" theorem (1932)

"Now let two wheels  $Z_1$  and  $Z_2$  be mounted at any two points of the rods  $a_1$  and  $a_2$  in such a way as to be free to rotate about these rods but not to slide along them."



Andrew Chin  
chin@unc.edu  
AndrewChin.com

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of NORTH CAROLINA  
at CHAPEL HILL

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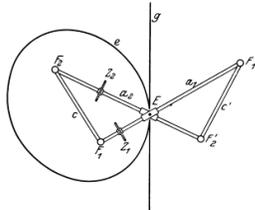
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### Hilbert's "peculiar" theorem (1932)

"[T]he study of Yates' apparatus leads to a peculiar geometric theorem which may be formulated as follows:"



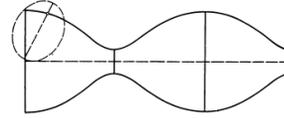
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chin@unc.edu  
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### Hilbert's "peculiar" theorem (1932)



"Given a roulette generated by a focus of an ellipse, on the normals to the roulette draw the points whose distance from the curve, measured in the direction of the center of curvature, is equal to the constant sum of focal radii for the ellipse..."

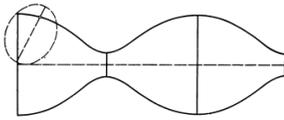
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chin@unc.edu  
AndrewChin.com



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### Hilbert's "peculiar" theorem (1932)



"then the points thus marked out lie on another roulette generated by a focus of the ellipse; this ellipse is congruent to the first ellipse and rolls on the same curve as the first ellipse but on the opposite side of that curve."

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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### A claim covering all structural uses of Yates's Theorem

- An apparatus for drawing ellipses, comprising:
  - a base;
  - a first member having a first end and a second end separated by a first distance  $c$ , both of said ends being attached to said base;
  - a second member having a first end and a second end separated by a second distance  $a > c$ , the first end of said second member being connected by a revolute joint to the first end of said first member;
  - a third member having a first end and a second end separated by said first distance  $c$ , the first end of said third member being connected by a revolute joint to the second end of said second member;
  - a fourth member having a first end and a second end separated by said second distance  $a$ , the first end of said fourth member being connected by a revolute joint to the second end of said third member and the second end of said fourth member being connected by a revolute joint to the second end of said first member; and
  - a revolute joint assembly slidably attached to said second member and to said fourth member, permitting said second member and said fourth member to slide independently of each other and to rotate independently of each other about an axial point  $E$ , said axial point  $E$  being located on said revolute joint assembly, whereby the movement of said axial point  $E$  relative to said base is constrained to the points of an ellipse whose foci are the first end and the second end of said first member and whose major diameter is  $a$ .

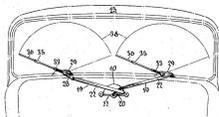
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chin@unc.edu  
AndrewChin.com



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### Linkages and patents



Flash of Genius (2008)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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### Watt's patent specification

"My second new improvement on the steam engines consists in methods of directing the piston rods, the pump rods, and other parts of these engines, so as to move in perpendicular or other straight or right lines ... so as to enable the engine to act on the working beams ... both in the ascent and descent of their pistons."



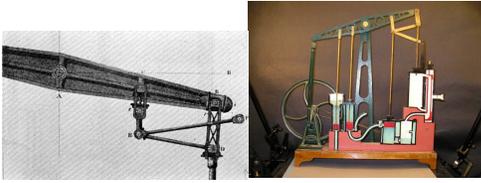
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## Watt's "parallel motion" linkage



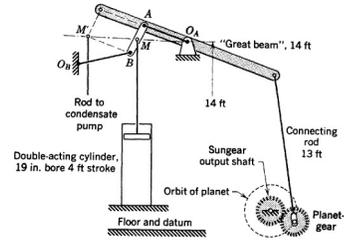
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chin@unc.edu  
AndrewChin.com



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## Watt's "parallel motion" linkage



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chin@unc.edu  
AndrewChin.com

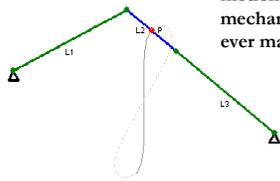


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## Watt's "parallel motion" linkage (1784)

"I am more proud of the parallel motion than of any other mechanical invention I have ever made."



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chin@unc.edu  
AndrewChin.com

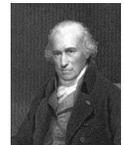


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## Watt's patent specification

"[A]ll the dimensions admit of considerable variation, according to the exigency of the case, and, **preserving the proportions**, are applied to cylinders of different diameters and lengths of stroke."



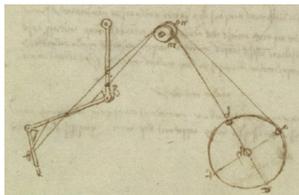
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chin@unc.edu  
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## Da Vinci's three-bar linkage



*Codex Madrid I* (1493)

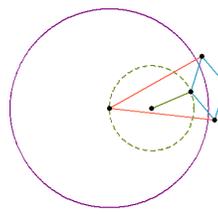
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## The Peaucellier cell



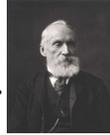
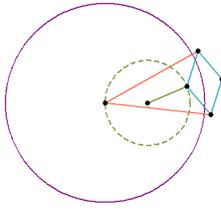
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chin@unc.edu  
AndrewChin.com



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## The Peaucellier cell



Lord Kelvin “nursed it as if it had been his own child, and when a motion was made to relieve him of it, replied ‘No! I have not had nearly enough of it - it is the most beautiful thing I have ever seen in my life.’”  
- J.J. Sylvester

Andrew Chin  
chin@unc.edu  
AndrewChin.com



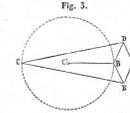
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## Peaucellier's Theorem

M. Peaucellier, *Note sur une question de géométrie de compas*, 12 NOUVELLES ANNALES DE MATHÉMATIQUES (2<sup>D</sup> SER.) 71, 74 (1873)

fixe  $C'$ , auquel on reliera le point B, le lien  $C'B$  étant d'une longueur égale à la distance  $CC'$  des centres fixes.  
Ce qui précède constitue une solution rigoureuse du problème posé par Watt; elle est assez simple pour pouvoir être employée avec avantage dans certaines machines à longue course. M. Mannheim, en 1867, en a fait



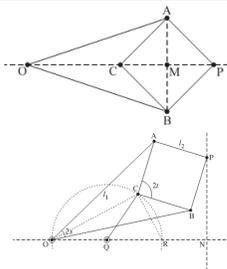
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chin@unc.edu  
AndrewChin.com



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## Peaucellier's Theorem



Given:  $OA = OB = l_1$ ,  $AP = BP = AC = BC = l_2$ , and  $\cos^2(s) = \frac{l_2}{l_1}$ . Then:  $OM^2 + AM^2 = l_1^2$ ,  
 $PM^2 + AM^2 = l_2^2$  (Pythagorean Theorem); thus  $OC \cdot OP = (OM - PM)(OM + PM) = l_1^2 - l_2^2$  is a constant. Fix  $O, Q$  so that  $OQ = OC$ ; i.e.,  $C$  moves on a circle centered at  $Q$ . Then  $\angle OCR = 90^\circ$ . Drop perpendicular  $\overline{PN}$  from  $P$  to  $\overline{OQ}$ ; then  $\triangle OCR \sim \triangle ONP$  and  $ON = \frac{OC \cdot OP}{OR} = \frac{k^2}{2OQ}$  is a constant; i.e.,  $N$  is stationary. Thus  $P$  moves on a straight line perpendicular to  $\overline{OQ}$ .

Andrew Chin  
chin@unc.edu  
AndrewChin.com

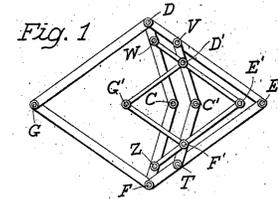


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## U.S. Patent 1,190,215 (issued 1916)

1. A constant product linkage comprising a large Peaucellier cell and a similar smaller Peaucellier cell, and connections to keep their corresponding angles equal.



Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Kinematics

The **science of pure motion**, which studies the relative geometric displacements of points and links of a mechanism, **without regard to forces that generate those displacements or the physical embodiment that realizes them**

$$F = ma$$

$$KE = \frac{1}{2} mv^2$$

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## Machine

A device consisting of fixed and moving parts that modifies **mechanical energy** and transmits it in a more useful form.

American Heritage Dictionary (4<sup>th</sup> ed. 2000)

**Patent machines, not kinematics!**

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## A Causal Ontology of the Patent System

- The conception of an invention as a *mental cause* of its reduction to practice
- The incentive of a patent grant as an *economic cause* of the hastening of an invention's discovery, disclosure and/or commercialization
- The disclosure of a patentable invention as a constructive *legal cause* of the public's use of the claimed invention during the patent term
- The process of using a patented invention as the *empirical cause* of a beneficial effect

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## A Causal Ontology of the Patent System

- The conception of an invention as a *mental cause* of its reduction to practice
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- **The process of using a patented invention as the *empirical cause* of a beneficial effect**

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## My Test

- A patentable invention entails an inventive design of a causal process; specifically, the process of using the invention to cause a beneficial effect.
- A causal process is a world line of an object that possesses a conserved quantity (e.g., mass, energy, momentum, etc.).

Andrew Chin  
chin@unc.edu  
AndrewChin.com

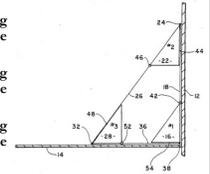


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## U.S. Patent 4,575,943 (issued 1986)

1A. An angle measuring apparatus comprising:  
three tape measures each having a housing and a tape extending therefrom;  
the tape of the first of said tape measures being connected to the housing of said second tape measure;  
the tape of said second tape measure being connected to the housing of said third tape measure; and  
the tape of said third tape measure being connected to the housing of said first tape measure;  
said tape measures being adjustable such that the indicia output on each are identical when said apparatus indicates a right triangle.



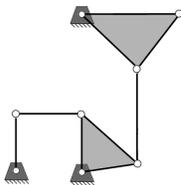
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chin@unc.edu  
AndrewChin.com



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## Kinematic diagram



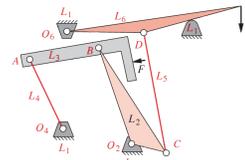
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chin@unc.edu  
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## Kinematic diagram



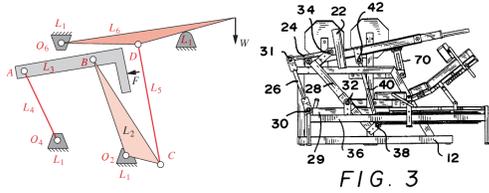
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chin@unc.edu  
AndrewChin.com



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### Kinematic diagram



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chin@unc.edu  
AndrewChin.com



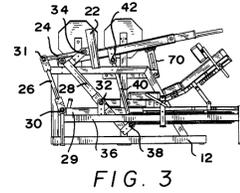
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### MedX Avenger® leg press



U.S. Patent 6,220,993  
(issued Apr. 24, 2001)



Andrew Chin  
chin@unc.edu  
AndrewChin.com



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### MedX Avenger® leg press



U.S. Patent 6,220,993  
(issued Apr. 24, 2001)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



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1. A leg press machine comprising in combination, a frame including a seat for an exerciser, a movement arm engagable by the feet of an exerciser for movement between retracted and extended positions...

### MedX Avenger® leg press



U.S. Patent 6,220,993  
(issued Apr. 24, 2001)

Andrew Chin  
chin@unc.edu  
AndrewChin.com



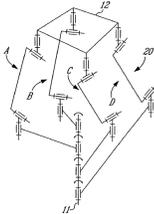
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... whereby the force required of the exerciser to move the movement arm from the retracted towards the extended position increases after initial movement from the retracted position.

### U.S. Patent 6,997,669 (issued 2006 to C. Gosselin)

1. A manipulator for receiving and displacing an object, comprising: a base; a moving portion, adapted to receive the object; four articulated support legs each extending between the moving portion and the base for supporting the moving portion, each of the articulated support legs being connected to the base by a first R-joint with axes of the first R-joints being parallel to one another, and with sequentially second, third, fourth and fifth R-joints connecting the first R-joints to the moving portion, with axes of the fifth R-joints not all being coplanar, the articulated support legs being topologically equivalent to one another with respect to the first, second, third, fourth and fifth R-joints, the articulated support legs being arranged with respect to one another between the base and the moving portion so as to restrict movement of the moving portion to three translational degrees of freedom and one rotational degree of freedom; and four angular actuators being each operatively connected to a different one of the R-joints for controlling the movement of the moving portion in any one of the three translational degrees of freedom and the one rotational degree of freedom.



Andrew Chin  
chin@unc.edu  
AndrewChin.com



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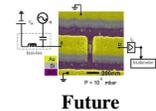
### Machines that do math



Past



Present



Future

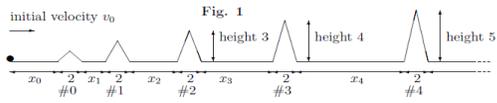
Andrew Chin  
chin@unc.edu  
AndrewChin.com



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## The bagatelle computer



Andrew Chin  
chin@unc.edu  
AndrewChin.com



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