

# Does Winning a Patent Race lead to more follow-on Innovation?

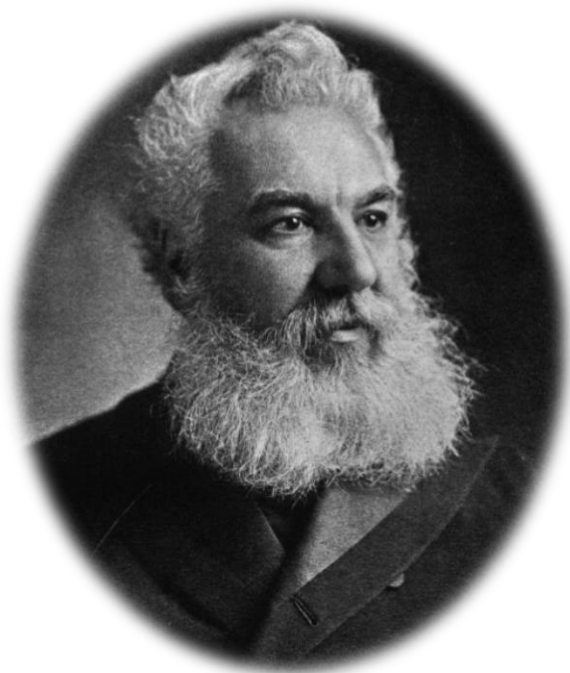


Neil C. Thompson  
MIT

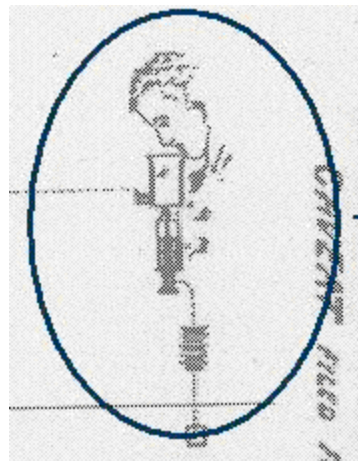
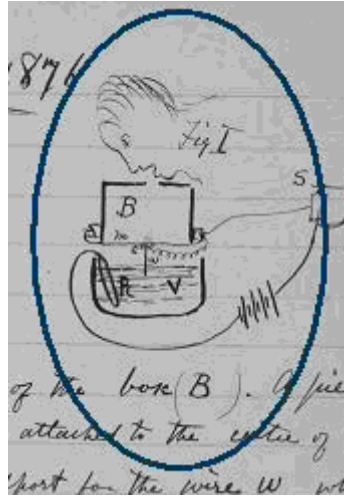


Jeffrey M. Kuhn  
UNC Chapel Hill

# The race for the telephone patent



Alexander Graham Bell



Images from Seth Schulman



Elisha Gray

## Research Questions

What does patent racing look like in the real world?

What happens to companies that win (or lose) a patent race?

How does patent racing affect follow-on research?

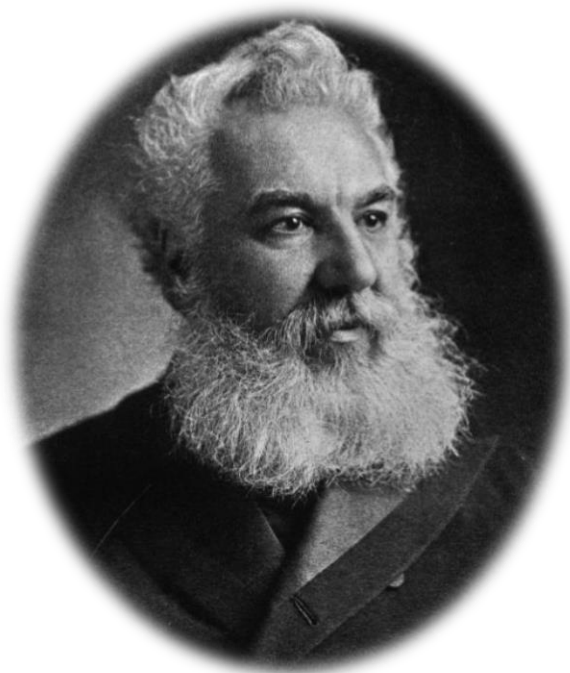
# Today

Observing Patent Races

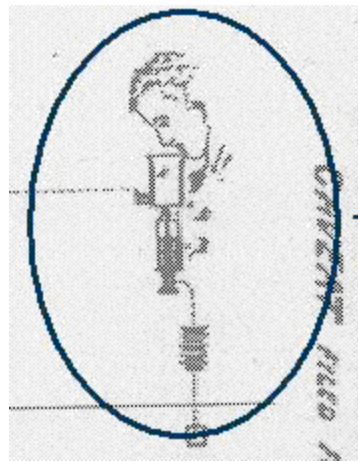
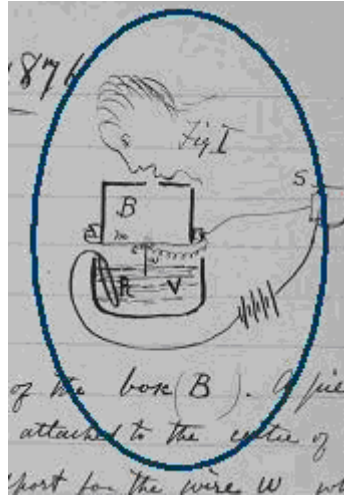
Descriptive Statistics

Effects from Winning / Losing

# The race for the telephone patent



# Alexander Graham Bell



# Elisha Gray

Images from Seth Schulman

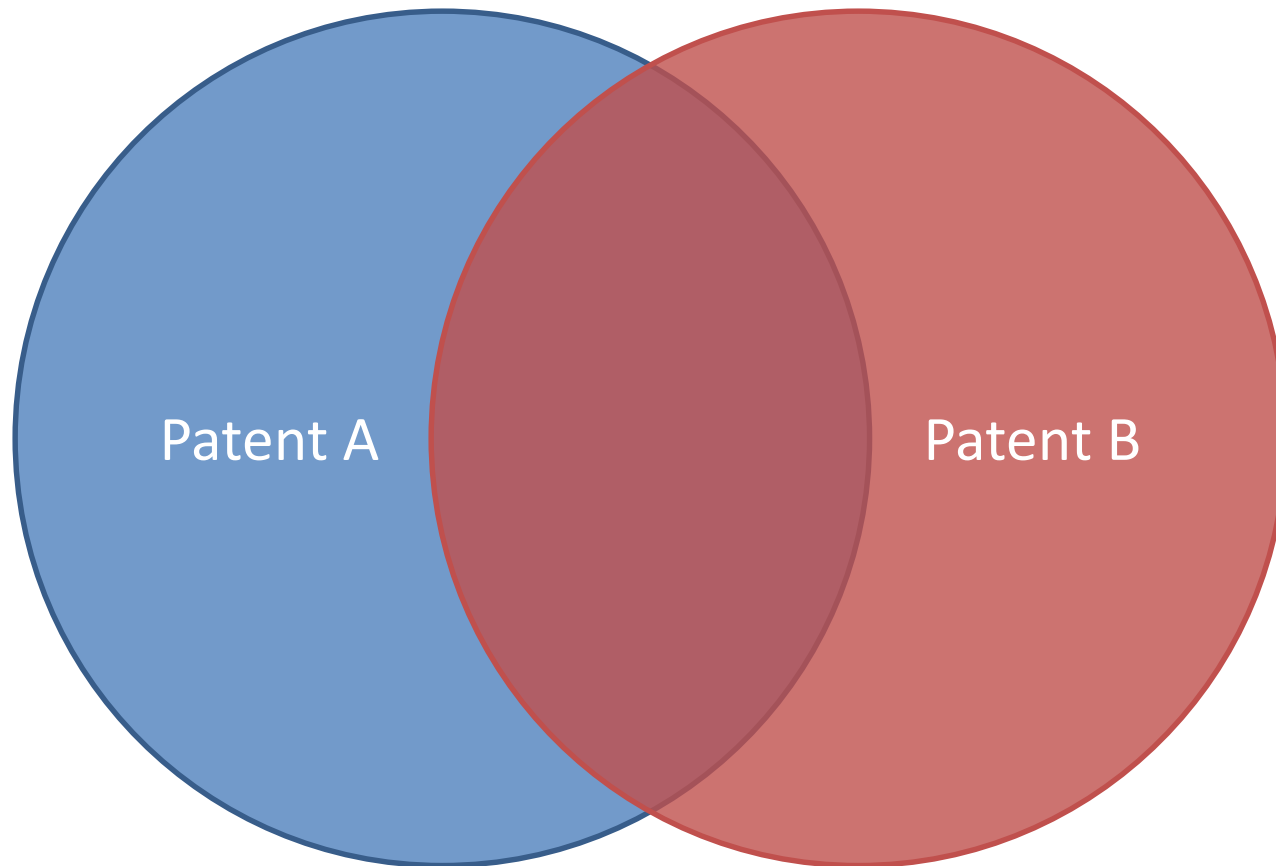




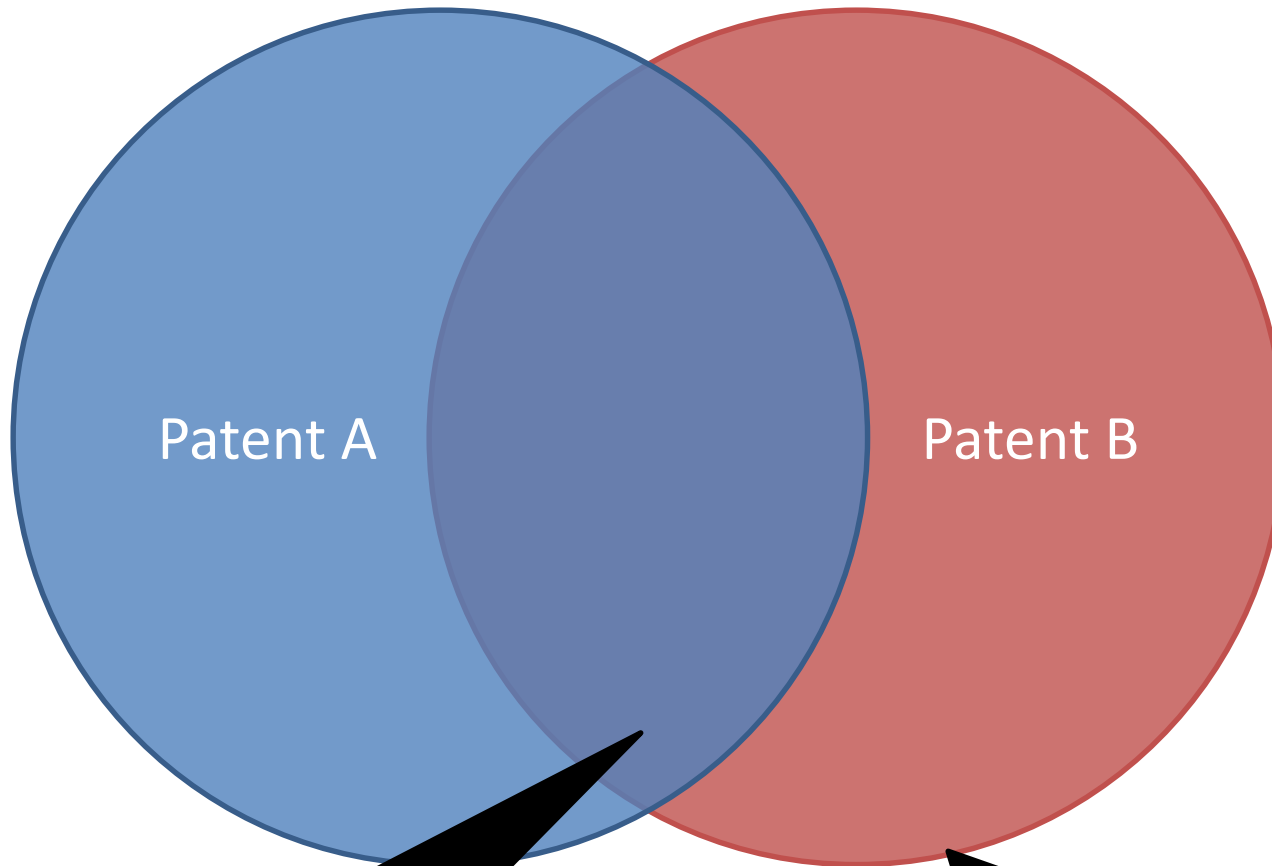
**Theory:** Winner Takes All



**Practice:** Winner Takes More



Typically, the winner *and the loser* get patents



Contested patent scope  
goes to the winner

Loser still has some  
patent scope to claim

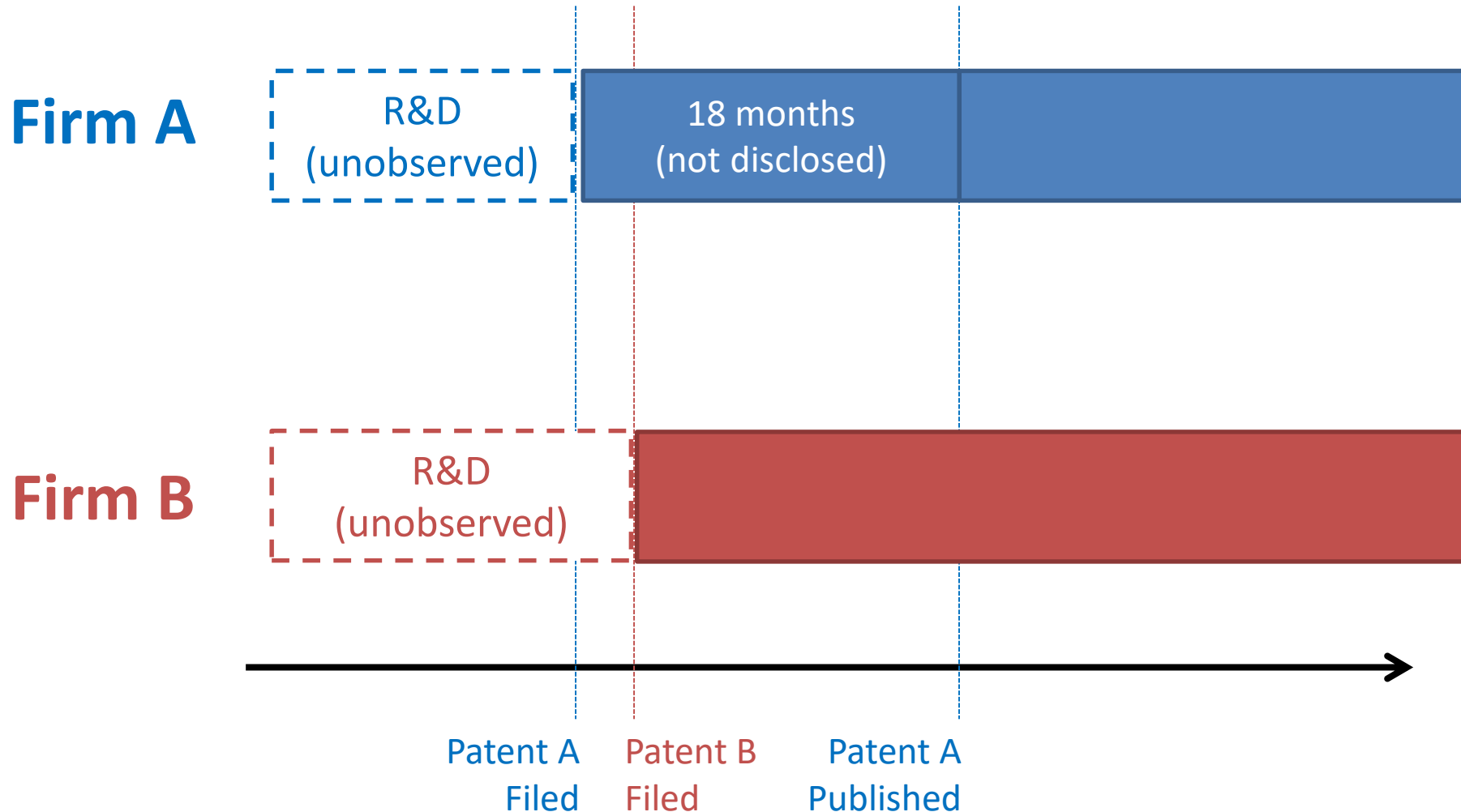


# Identifying patent races

Patent applications filed...

1. ....about the same time...
2. ...on the same invention

**“About same time” = In non-disclosure window**

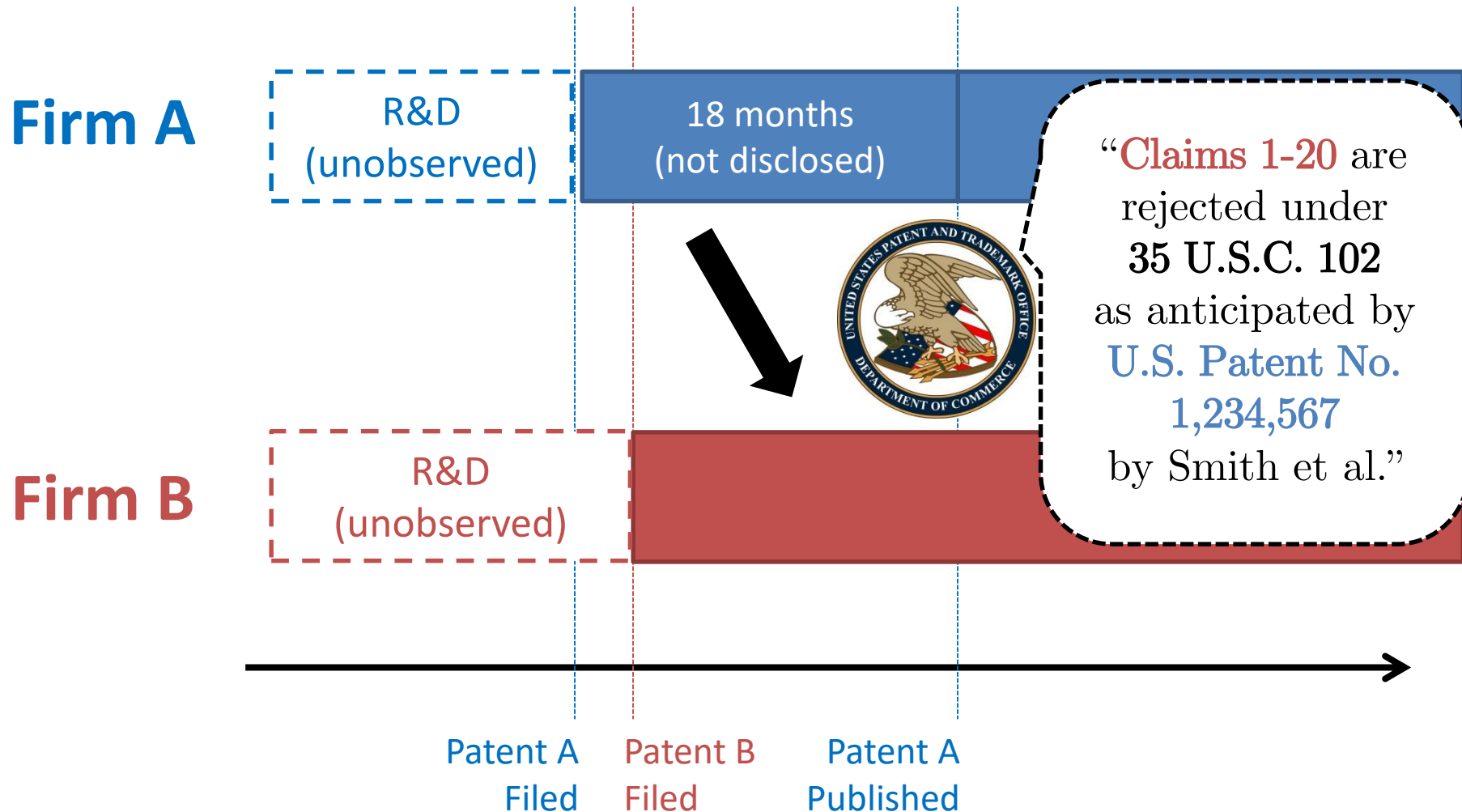


# U.S. Patent Law 35 U.S.C. 102

## **Novelty Rejection**

“The identical invention ... be shown in as complete detail as is contained in the ... claim”

# “On the same invention” = Patent examiner rejects a duplicate claim



**But are these really patent races?**



# Example from our data

**April 2005**

Cardiac Pacemakers Inc.

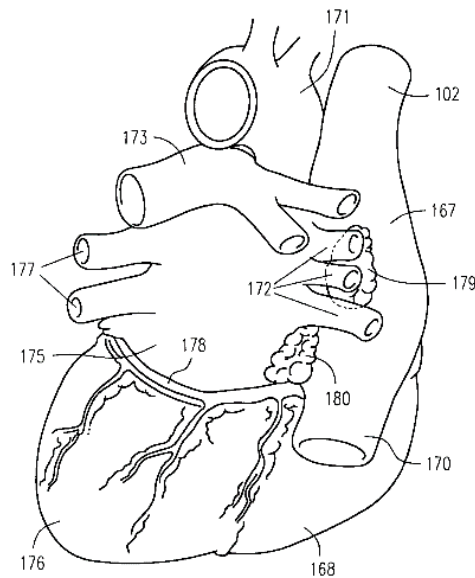


FIG. 1C

**Dec 2005**

Pacesetter Inc.

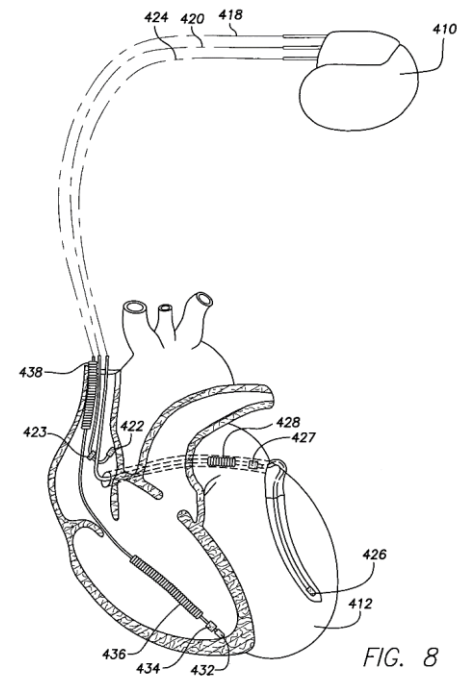
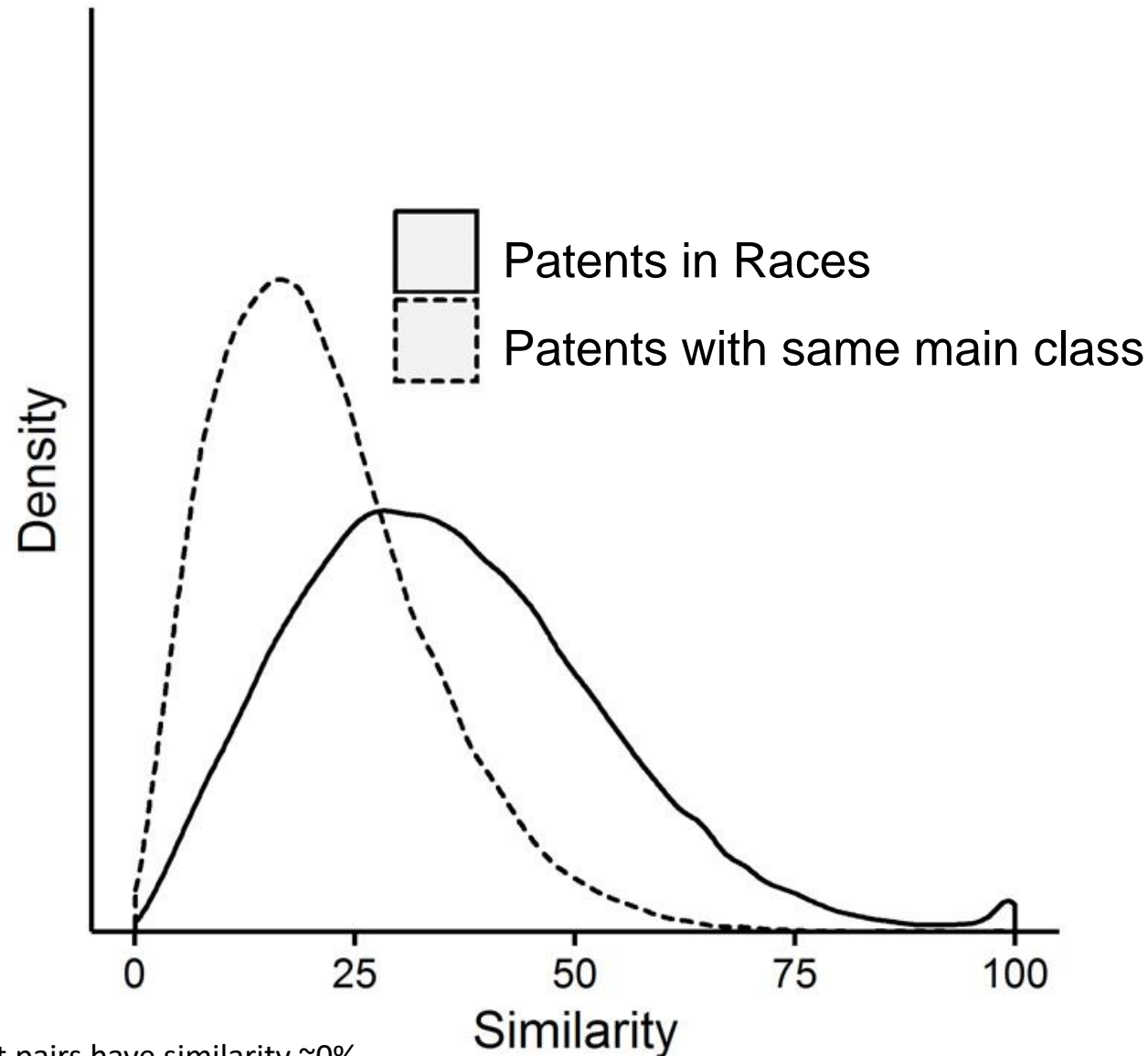


FIG. 8

Both trying to detect cardiac events with  
signal processing algorithms

# Descriptions of the Technologies are very similar

(based on the measure from Younge and Kuhn, 2016)



Note: 97% of all patent pairs have similarity ~0%

# Today

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Descriptive Statistics

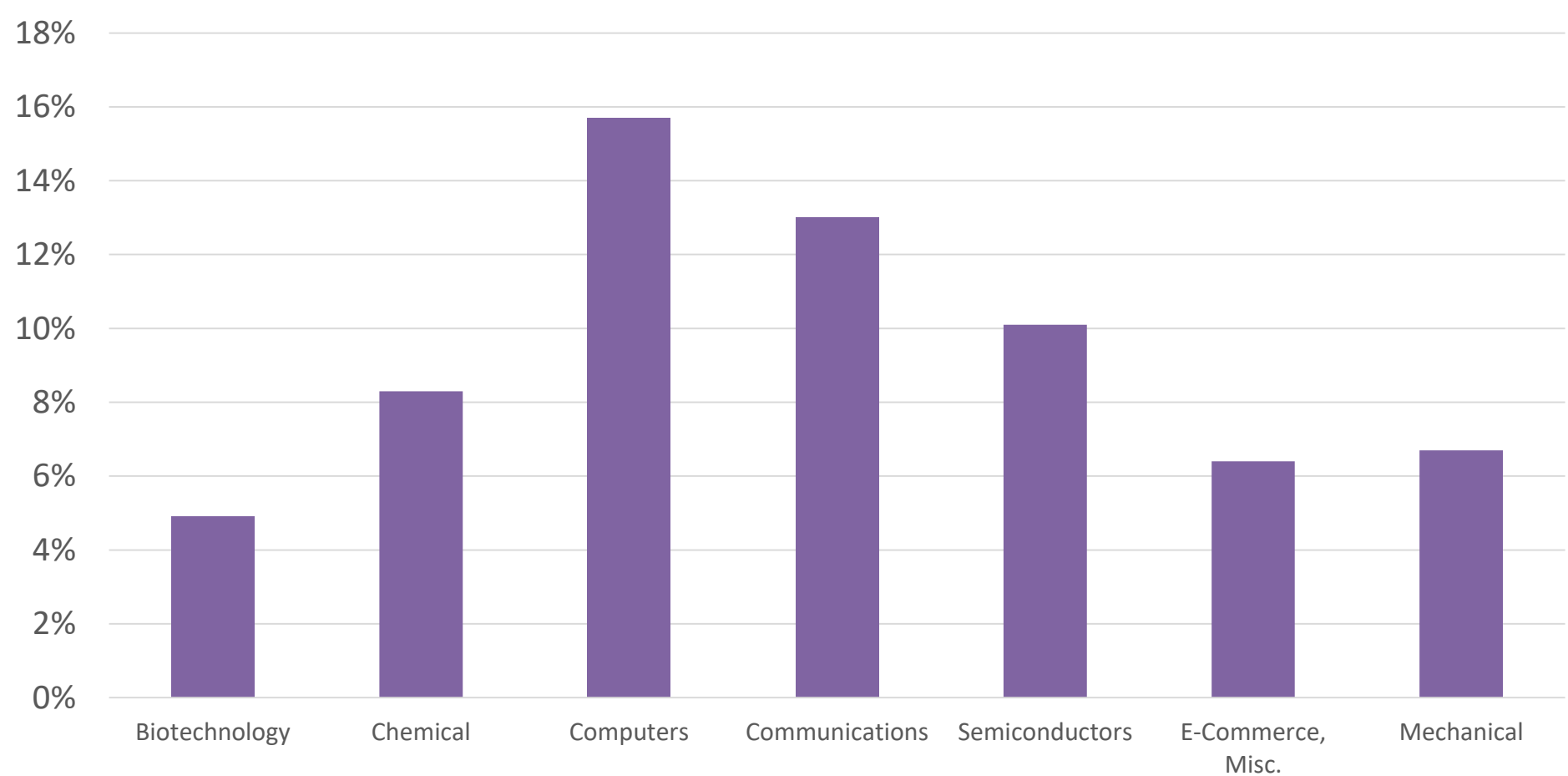
Effects from Winning / Losing

## **Finding 1**

~10% of all patents are in patent races

# Finding 2: Racing happens unevenly across technology areas

Share of Patents in Patent Races



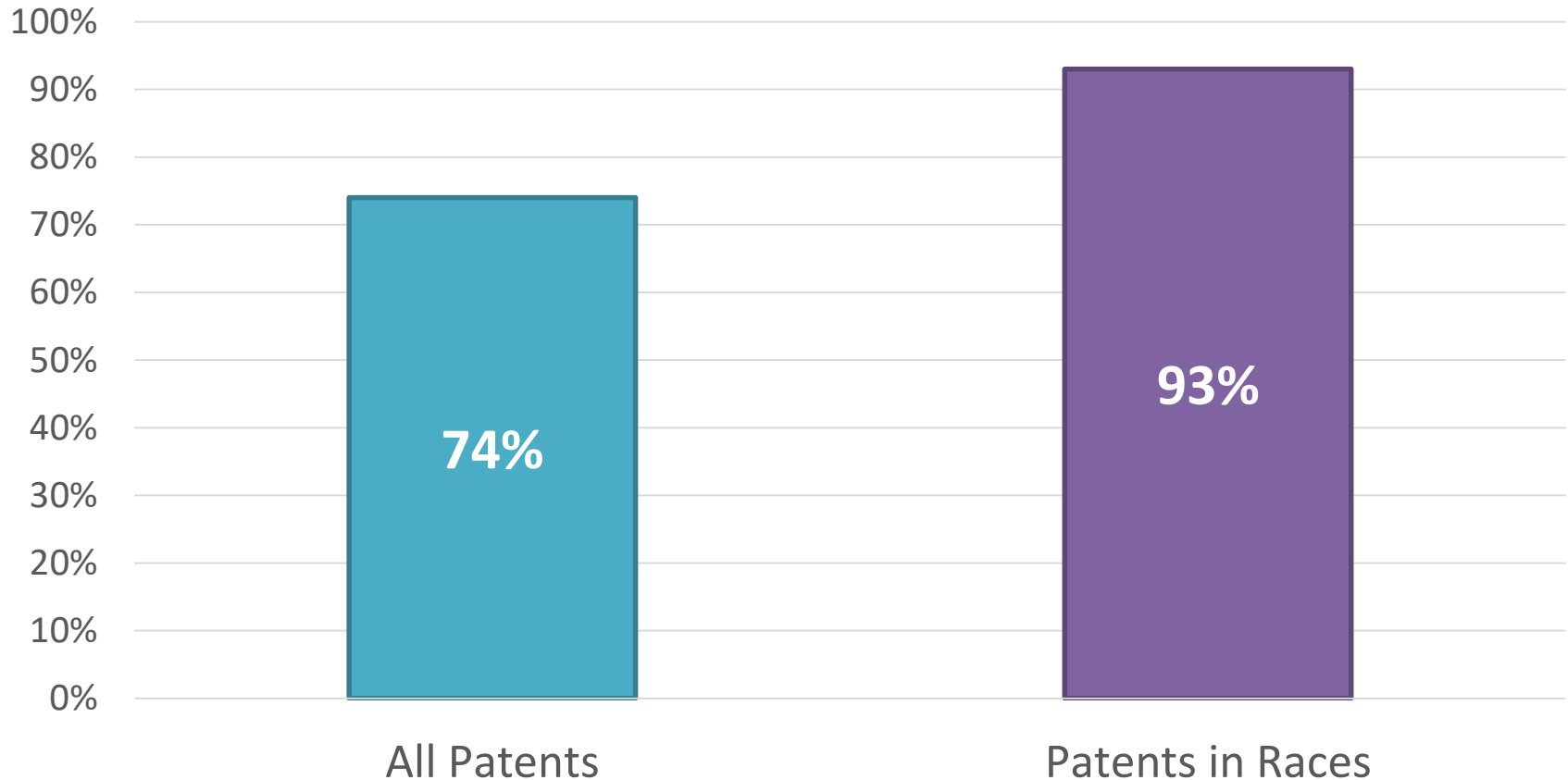
Proportions based on 2005 for most-complete data coverage



## Finding 3:

# Patent Races happen in 'crowded' areas

% of patents narrowed during examination



**Aside:** Patent Scope narrowing can be measured using claim wording  
(Kuhn and Thompson - [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2977273](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2977273))

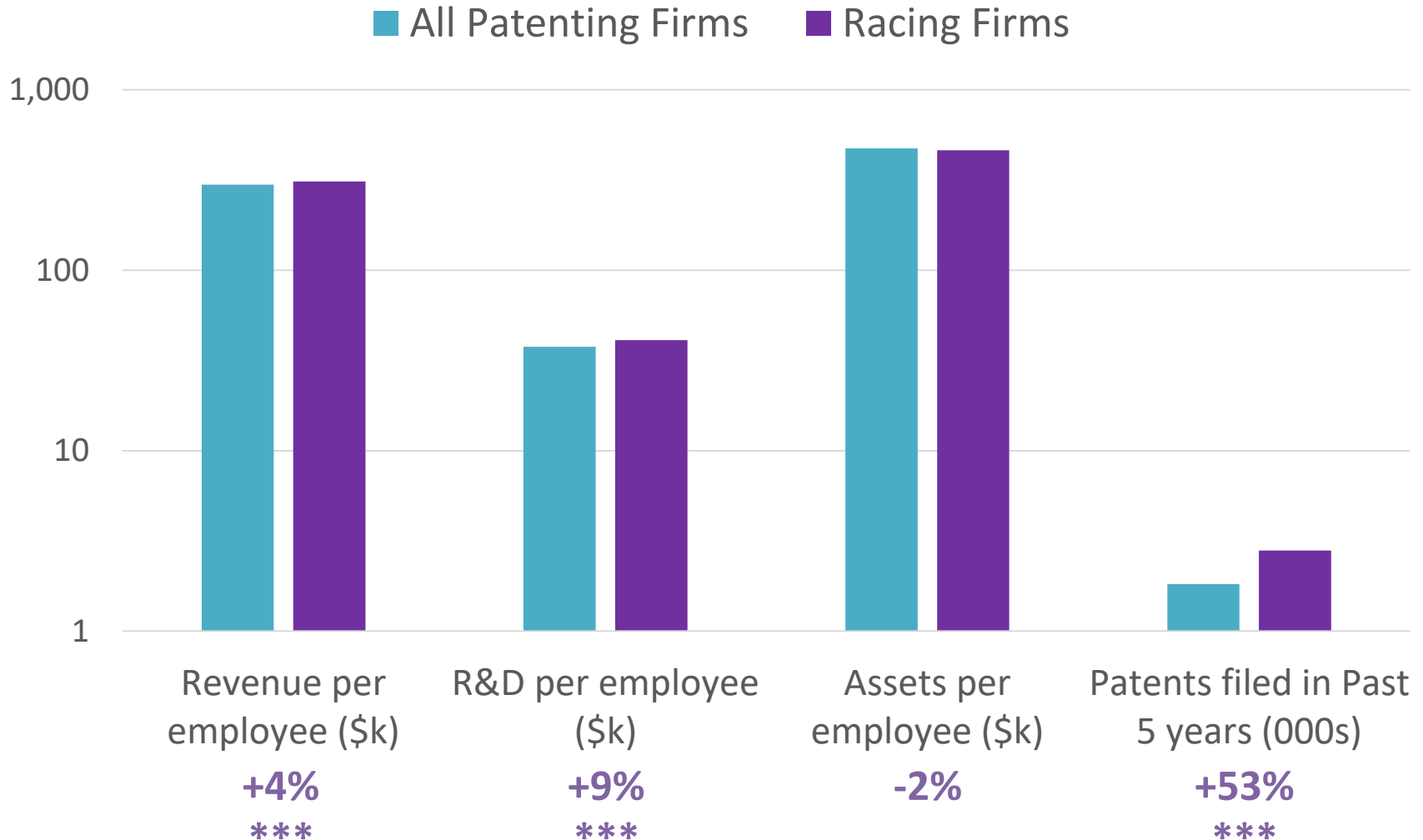
**For greater detail**

Narrow to only publically traded firms\*

\*requires looking at only issued patents

# Finding 4:

## Firms that race look different



Values as of 2005; Values are patent-weighted averages across firms

# Today

Observing Patent Races

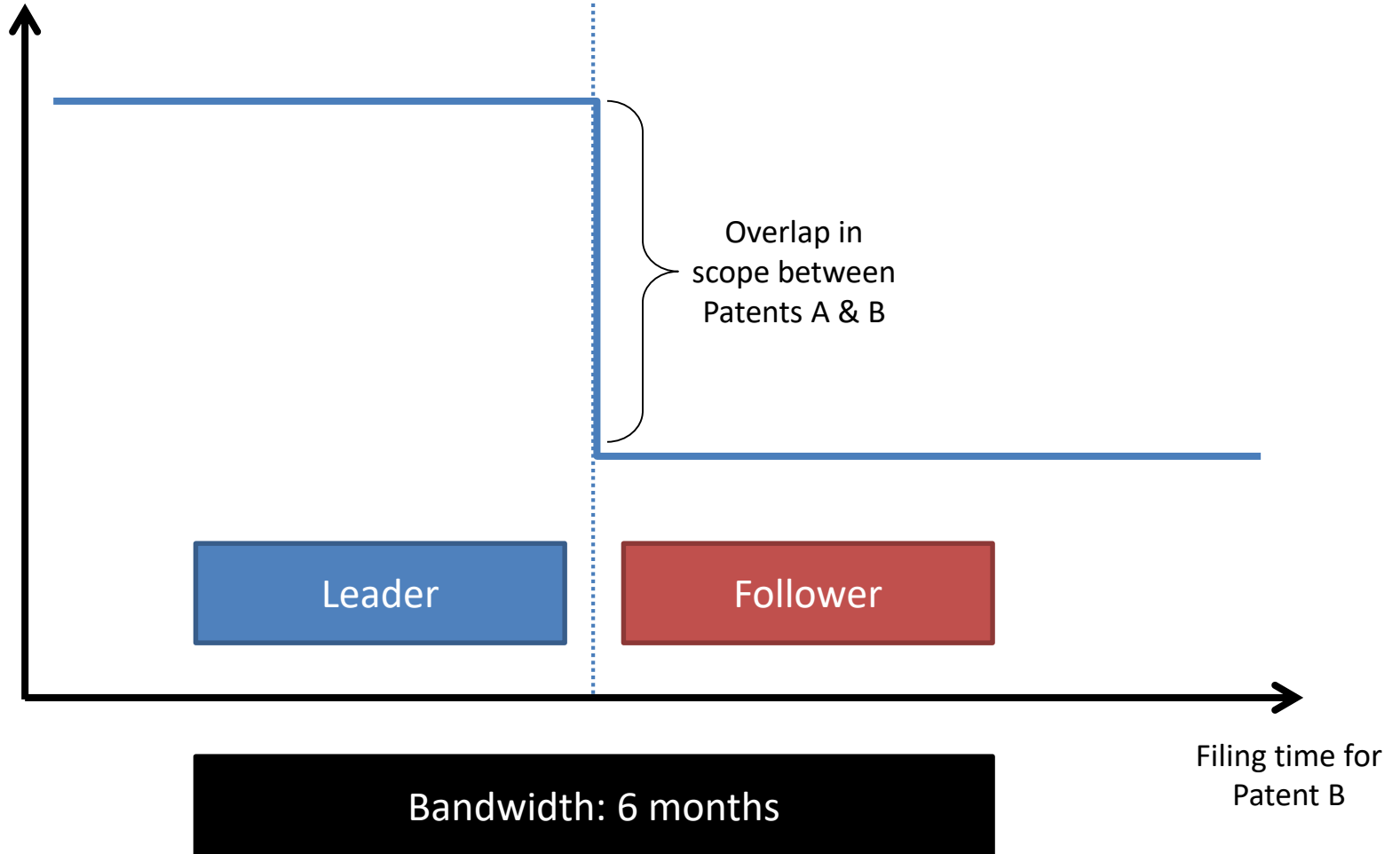
Descriptive Statistics

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# Regression Discontinuity design

Patent Scope  
for Patent B

Patent A filed





# But what about interference?

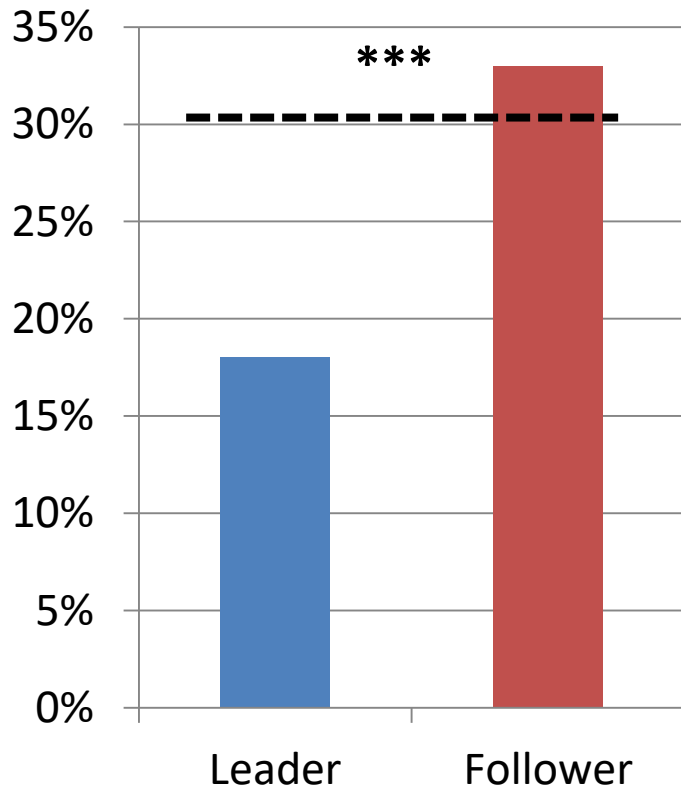
- Typical legal fees for interference: \$650,000
  - More than value of 2/3 of all patents (Gambardella et al., 2005)
- Quinn 2010:

“In fiscal year 2007 **only 7** interference proceedings resulted in the patent going to the second to file”

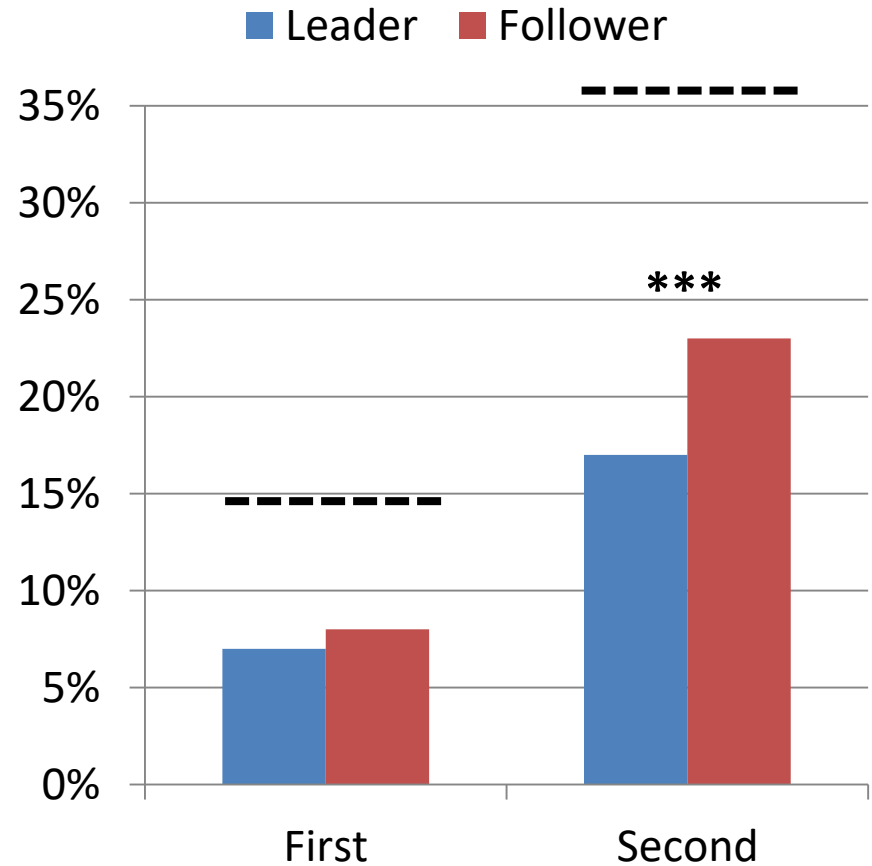
# **Outcomes at the Patent Level**

# Abandoning Protection

## Abandonment Rates



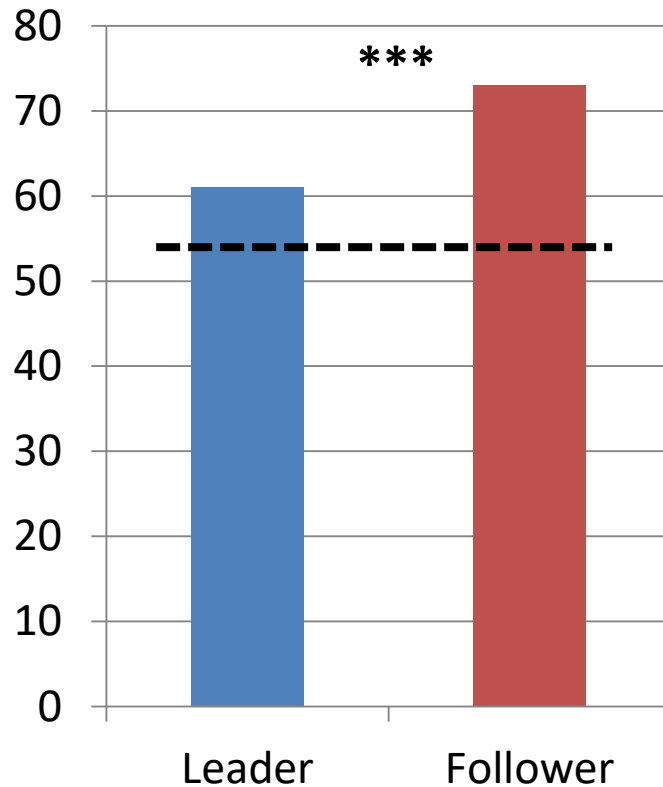
## Failure to pay Maintenance Fees



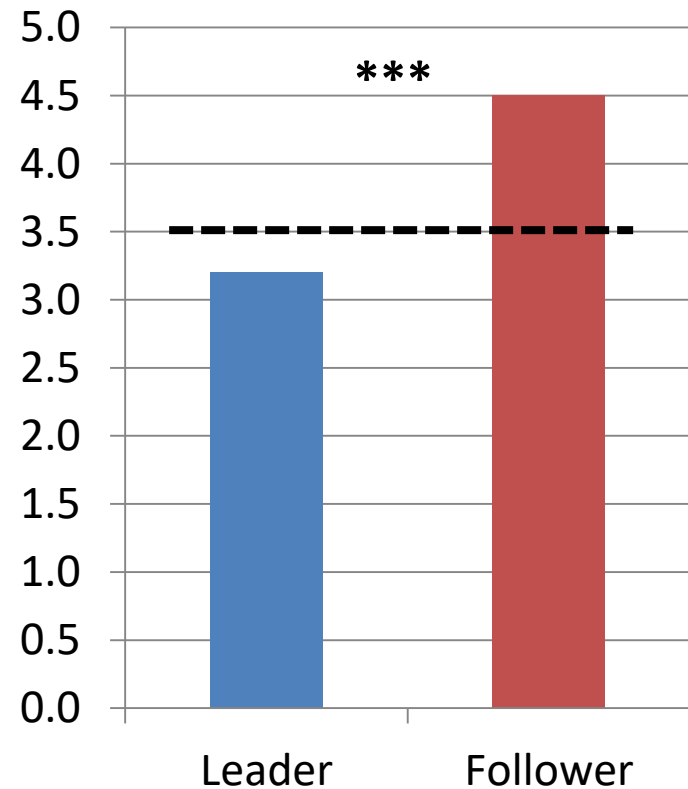
--- All Patents

# Getting Less Protection, Later

Scope Narrowing  
(words)



Pendency (Years)



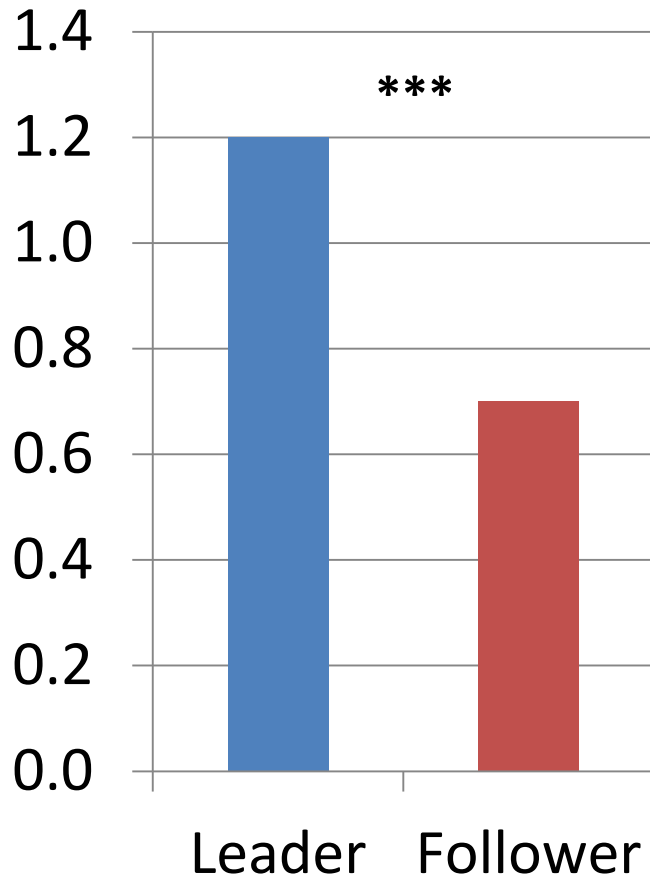
--- All Patents

# **Outcomes at the Project Level (i.e. Follow-on Research)**



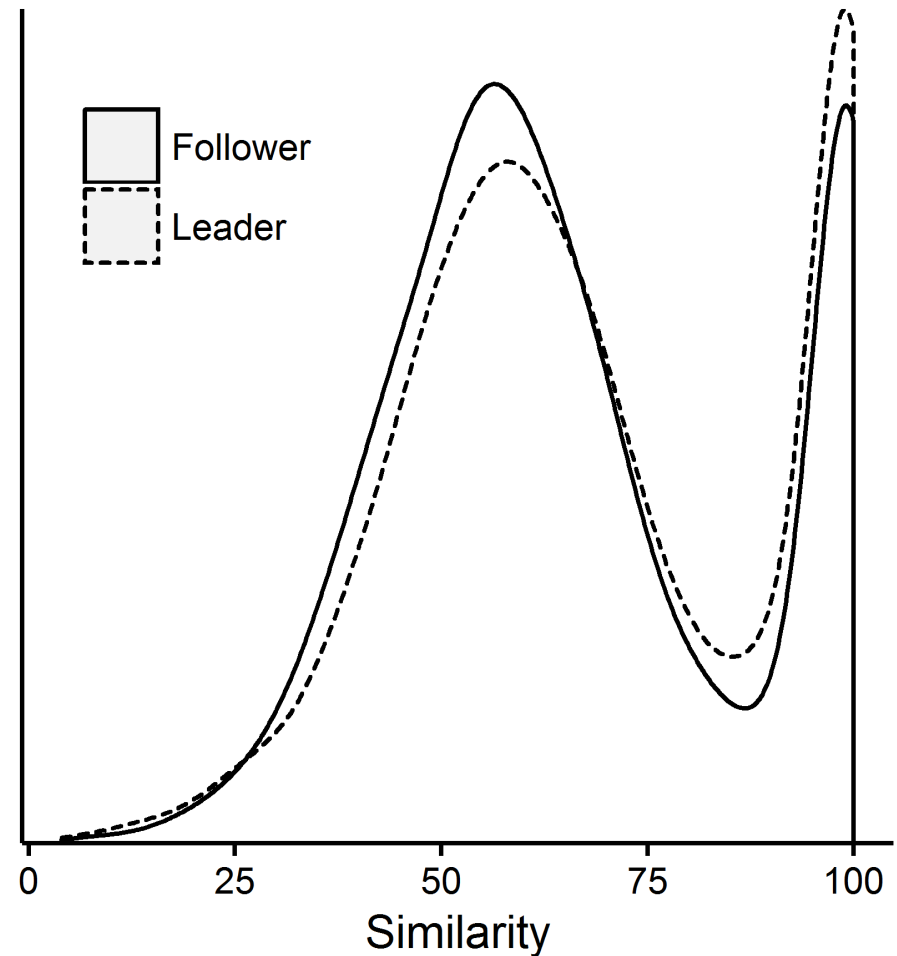
# Leaders do more follow-on research

## # Follow-on Self-Citations



Leaders do more follow-on research

## Closest follow-on patent



The research they do is 'closer'

# Contributions & Findings

- Empirical strategy for observing patent races
- Racing:
  - ~10% of patents
  - Most: Computers and Communications
  - Least: Biotechnology
  - Done by Firms with more R&D & Patenting
  - Happens in crowded I.P. areas
- Causal effects from winning the patent race:
  - Keep patent in force
  - More follow-on research
  - Closer follow-on research

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**THANK YOU**

**BACKUP**

~10M documents

# 10,000 CPUs

## Detect novelty rejections

