

BEAUTIFUL MIND and JOHN FORBES NASH Jr.

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March 21, 2007

"Beautiful Mind"

John F. Nash

Nash's Mathematics

Nash's illness



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BEAUTIFUL MIND and JOHN FORBES NASH Jr.

Basic Facts

Universal Pictures and DreamWorks, 2001.

Directed by **Ron Howard** (Nixon, The Da Vinci Code, The Alamo, Apollo 13, ...)

Written by **Sylvia Nasar** and **Akiva Goldsman**

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Written by **Sylvia Nasar** and **Akiva Goldsman**

Starring

- ▶ Russell Crowe (Master and Commander, Gladiator, LA Confidential, ...)
- ▶ Jennifer Connelly (Blood Diamond, Hulk, Pollock, Requiem for a Dream, ...)
- ▶ Ed Harris
- ▶ Paul Bettany

Academy Awards

Oscars awarded for

- ▶ Adapted Screenplay: Akiva Goldsman
- ▶ Best Picture: Brian Grazer and Ron Howard
- ▶ Directing: Ron Howard
- ▶ Supporting Actress: Jennifer Connelly

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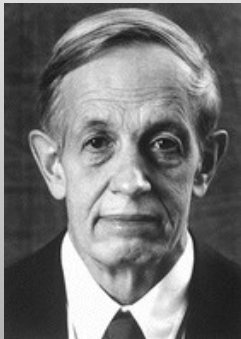
- ▶ Adapted Screenplay: Akiva Goldsman
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Nominations

- ▶ Best Actor
- ▶ Film Editing
- ▶ Best Makeup
- ▶ Original Music Score

The movie was *inspired* by the life and work of

John Forbes Nash Jr.



Basic Facts about John F. Nash

- ▶ born in 1928, West Virginia
- ▶ 1948 graduated from Carnegie Mellon
- ▶ 1950, PhD. from Princeton University, dissertation on non-cooperative games
- ▶ 1950 - 1958, significant work in algebraic geometry
- ▶ 1958, first signs of schizophrenia
- ▶ 1970, stopped taking medications
- ▶ 1980's, started to work in mathematics again
- ▶ 1994, received the **Nobel Prize in Economics**
- ▶ continues to work until today

"Beautiful Mind"

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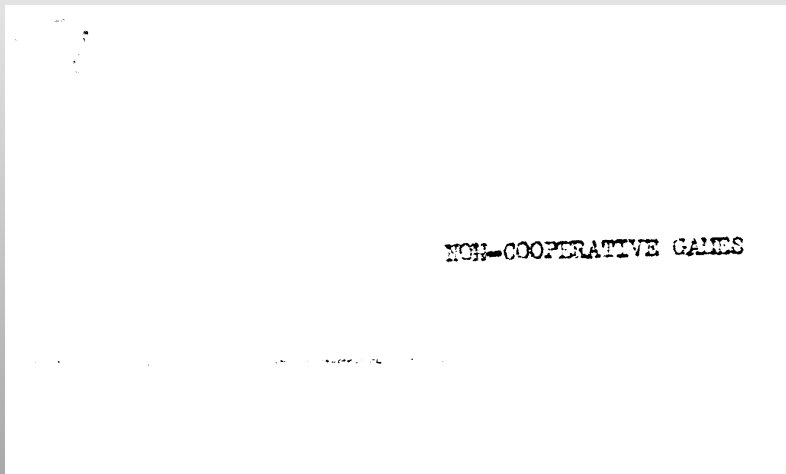
J.F. Nash, R. Crowe, R. Howard



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BEAUTIFUL MIND and JOHN FORBES NASH Jr.

Nash's Dissertation



Non-Cooperative Games

A non-cooperative game is one in which players can cooperate, but any cooperation must be self-enforcing.

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Competitive markets can be well modeled using non-cooperative games.

Nash Equilibrium

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Players are in equilibrium if a change in strategies by any one of them would lead that player to earn less than if she remained with her current strategy (provided the others do not change their strategies).

Non-Cooperative Games

Example: Game of Chicken

Boeing/Airbus	Build	Don't Build
Build	$(-10, -10)$	$(10, -1)$
Don't Build	$(-1, 10)$	$(5, 5)$

Non-Cooperative Games

Example: Prisoner's Dilemma

Mugsy/Spike	Silent	Rat
Silent	(2,2)	(10,0)
Rat	(0, 10)	(7,7)

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This was previously known for only two players and zero-sum games.

Nash's (mathematically) most famous work is **Nash embedding theorem**, which showed that any abstract Riemannian manifold can be isometrically realized as a submanifold of Euclidean space.

Nash's illness

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In the late 1980's, he gradually started to reconnect with the scientific community via e-mail.

Schizophrenia

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People with schizophrenia are generally not more violent or dangerous than other members of the population.

Schizophrenia

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People with schizophrenia are generally more likely to abuse substances, have much higher suicide rates (at least 30% attempt suicide at least once in a lifetime) and have the average life expectancy of about 10 years shorter than people without the illness.

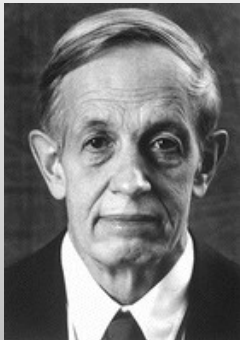
J.F. Nash on his illness:

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... I seem to be thinking rationally again in the style that is characteristic of scientists. However, this is not entirely a matter of joy as if someone returned from physical disability to good physical health. One aspect of this is that rationality of thought imposes a limit on a person's concept of his relation to the cosmos ...



THE END