GLOBAL TALENT FUND

# FINDING YOUNG EINSTEINS: OLYMPIADS AND STEM TALENT DISCOVERY

*Ruchir Agarwal, Harvard University, and Global Talent Fund*
*Patrick Gaule, University of Bristol, and Global Talent Fund*
*Yuyan Jiang, University of Cambridge*



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## ABSTRACT

Every generation produces a handful of scientists—Darwin, Curie, Einstein, Feynman—who transform how we understand the world. But how do we find the next ones? Despite decades of investment, we know surprisingly little about how to identify extraordinary scientific talent early. Spotting this talent sooner could help societies better nurture breakthrough potential, expand opportunity, and accelerate scientific progress. Here we show that teenage science competitions offer a powerful signal. Although International Science Olympiad medalists represent only about 1,000 students each year, they go on to win 10% of the world's most prestigious science prizes—at 20 times the rate of top university graduates. A gold medal at the International Mathematical Olympiad is especially predictive: 3 in 100 winners go on to win major prizes, making them 60 times more likely than even MIT alumni to produce scientific discoveries. The ability to solve complex problems as a teenager could be one of the strongest predictors of future scientific impact. These findings call for a rethinking of how we identify and invest in the minds that will shape tomorrow's science.

**Keywords**
Talent, Olympiads, Prizes, Economics of Talent

**JEL Codes**
I23, J24, O47, L83

# Finding Young Einsteins: Olympiads and STEM Talent Discovery*

Ruchir Agarwal

Patrick Gaule

Yuyan Jiang

September 24, 2025

**Abstract**

Every generation produces a handful of scientists—Darwin, Curie, Einstein, Feynman—who transform how we understand the world. But how do we find the next ones? Despite decades of investment, we know surprisingly little about how to identify extraordinary scientific talent early. Spotting this talent sooner could help societies better nurture breakthrough potential, expand opportunity, and accelerate scientific progress. Here we show that teenage science competitions offer a powerful signal. Although International Science Olympiad medalists represent only about 1,000 students each year, they go on to win 10% of the world's most prestigious science prizes—at 20 times the rate of top university graduates. A gold medal at the International Mathematical Olympiad is especially predictive: 1 in 40 winners go on to win major prizes, making them 50 times more likely than even MIT alumni to produce scientific discoveries. The ability to solve complex problems as a teenager could be one of the strongest predictors of future scientific impact. These findings call for a rethinking of how we identify and invest in the minds that will shape tomorrow's science.

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# 1 Introduction

Young Albert Einstein struggled in school. One of his school teachers in Munich declared, "You will never amount to anything."[1] He left school without a diploma and later failed the entrance exam to the Swiss Federal Institute of Technology. Yet this seemingly difficult student would go on to revolutionize our understanding of the universe. While Einstein eventually succeeded, many future Einsteins may sit unrecognized in today's classrooms. This raises a fundamental question: Can we develop reliable ways to identify exceptional talent early—and ensure they receive the support they need?

Talented individuals often drive progress in science and technology. Yet our current systems may fail to identify many potential innovators. Current policies tend to support scientists or innovators only after they have proven themselves, missing crucial early opportunities. Grants, fellowships, and incentives are common for those already established in the field. Far less emphasis is placed on finding and nurturing young, untapped potential. This focus risks missing future innovators at a formative stage when support could matter most.

So, how can we improve at identifying exceptional talent early? The International Science Olympiads offer one promising avenue. These prestigious global competitions challenge and recognize high school students' abilities across key scientific disciplines. Each Olympiad focuses on a specific field—e.g., mathematics, physics, chemistry, informatics, or biology—allowing students to demonstrate their skills on a global stage. Unlike traditional metrics such as grades or test scores, the Olympiads emphasize creative thinking and advanced problem-solving abilities.

Olympiad alumni stories are compelling. Guido van Rossum, an International Mathematical Olympiad (IMO) bronze medalist, created the Python programming language. OpenAI's founding team includes Greg Brockman, Wojciech Zaremba, and John Schulman---all Olympiad participants. Vitalik Buterin, who won bronze at the International Informatics Olympiad, went on to create Ethereum. Grigori Perelman, an IMO gold medalist, solved the century-old Poincaré conjecture. Yet despite these examples, there has been little systematic analysis of how Olympiad performance predicts future achievements.

This paper aims to fill that gap. We examine how success in International Science Olympiads relates to long-term achievement in STEM. One challenge is the limited data that connects early academic success to later career outcomes, especially beyond college. Labor force surveys offer limited

[1]Physicist and science historian Martin Klein (1965) attributes this quote to Einstein's Greek teacher at Munich's Luitpold Gymnasium. He also comments that, "It is sobering to think that no teacher had sensed his potentialities," suggesting that traditional schooling often fails to recognize exceptional talent.

insight into early achievements, making it difficult to trace the progression from youth excellence to professional success. The rarity of both outstanding youth performance and significant accomplishments in STEM careers further complicates such analysis.

We address these challenges by using publicly available competition results, combined with lists of major scientific award winners such as the Fields Medal, ACM Turing Award, and Nobel Prizes. This approach lets us track Olympiad participants and see whether they go on to become leaders in science or mathematics. We focus on the first five Olympiads: mathematics, physics, chemistry, informatics, and biology. We refer to these as the International Science Olympiads.

We present three main results:

1. *Frontier Science:* Although Olympiad medalists number only in the hundreds each year, they account for 10% of major science prize winners (such as Fields Medals), with this share rising to 13% for math-specific awards.

2. *Exceptional Success Rate:* Medalists from the five major Olympiads are 10 times more likely to win major science prizes than undergraduate alumni from the world's top ten universities.

3. *Predictive Power of Math and Gold Medals:* Among Olympiad medalists, those from the International Mathematical Olympiad (IMO) and higher-level achievers are more likely to win major science awards. IMO gold medalists (around 50 each year) achieve these awards at 115 times the rate of graduates from the top 10 global universities. Remarkably, about one in 40 IMO gold medalists secures a major science prize—50 times the rate of an MIT undergraduate.

Our findings indicate that high school copetitions, particularly the International Science Olympiads, are an effective way to identify promising STEM talent at an early age. Mathematics competitions, in particular, are strong predictors of future success. A policy implication of these findings is that Olympiad results could be used more extensively to allocate scholarships and other forms of early support.

This paper contributes to the discussion on policies that support science and innovation (Freeman & Van Reenen, 2009; Stephan, 2010; Bloom, Van Reenen & Williams, 2019), with a focus on expanding the supply of scientists (Freeman, 1975; Shu, 2015; Toivanen & Väänänen, 2016; Bell et al., 2019a, 2019b; Agarwal & Gaule, 2020).[2] A crucial policy tool in this context is financial support

[2]While the literature has often focused on pull incentives, such as competitive salaries (Freeman, 1975; Shu, 2015) or tax policies (Bell et al., 2019a), recent studies have taken a broader view, considering factors like educational access (Toivanen & Väänänen, 2016), exposure to innovation (Bell et al., 2019a, 2019b), and beliefs (Ganguli, Gaule & Vuletic, 2022).

for young talent. Although studies have examined the impact of funding at the doctoral or post-doctoral levels (Freeman, 2005; Kahn & MacGarvie, 2011; Jacob & Lefgren, 2011; Graddy-Reed, Lanahan & D'Agostino, 2021), few have explored how to target these scholarships most effectively. This paper proposes a strategy for identifying and supporting high-potential young individuals likely to advance the knowledge frontier.

Our work builds on insights from Aghion et al. (2017), who found that IQ in early adulthood, measured through an army entrance test, correlates with inventive output. Being in the top 10% of the IQ distribution increases the probability of inventing by 2-3 percentage points, compared to an average of 1%. Although their focus was not on identifying future scientists, their findings imply that early aptitude tests could help identify those with significant potential. Our study extends this by showing that participation in high school competitions, such as the International Science Olympiads, provides an even more actionable signal of future scientific success.

Agarwal & Gaule (2020) track the careers of IMO medalists and find that those from developing countries are less likely to engage in knowledge production. A notable result is that IMO gold medalists are 50 times more likely to win the Fields Medal than Ph.D. graduates from the top 10 universities. While this finding highlights the exceptional potential of IMO participants—consistent with our paper—it is based solely on the Fields Medal and lacks comparisons with other Olympiads.[3] Our research expands on this by including participants from various Olympiads and examining their long-term achievements across multiple STEM fields and major scientific awards, underscoring the broader predictive power of early competition success.

Agarwal et al. (2023) show that IMO medalists are more productive when they migrate to the U.S. They also find that financial constraints prevent many from studying in their preferred destinations, such as the U.S. or U.K. This underscores the importance of scholarships and targeted financial support. Our findings align with this, demonstrating that high school competitions can serve as practical tools for identifying individuals who would benefit most from such support.

The paper is organized as follows: Section 2 provides background on the International Science Olympiads. Section 3 outlines our data collection and methodology, and Section 4 presents the results. Section 5 discusses policy implications, limitations, and future research directions.

[3] One issue with the Fields Medal is that its eligibility is restricted to individuals 40 years of age or younger, which may favor those who show early promise—similar to high school competitions.

## 2 The International Science Olympiads

The International Science Olympiads are prestigious global competitions that challenge and recognize high school students' abilities across key scientific disciplines. Each Olympiad focuses on a specific field—mathematics, physics, chemistry, informatics, or biology—and provides a global stage for students to demonstrate advanced problem-solving and creative thinking skills that go well beyond standard curricula. Unlike traditional metrics such as grades or test scores, the Olympiads emphasize originality, analytical reasoning, and applied knowledge.

Participation begins at the national level, where countries hold rigorous selection processes involving regional and national competitions. The top-performing students advance to the international stage, which now attracts about 2,000 participants each year from over 100 countries (see Fig. 1). While there is a team component, students ultimately compete as individuals and are awarded medals based on their performance. Medals are typically distributed in gold, silver, and bronze categories at ratios of roughly 1:2:3, with additional certificates of merit or honorable mentions given to strong performers who fall just short of a medal.

*The International Mathematical Olympiad (IMO)*, established in 1959, is the oldest and most prominent of these competitions. It began in Eastern Europe and has expanded to include more than 100 countries. Each participating nation may send up to six students under the age of 20 who are not yet enrolled in a university. The competition is held over two consecutive days, with three problems presented each day. Each problem is worth seven points, for a maximum total of 42. The problems span core areas of secondary school mathematics, such as geometry, number theory, algebra, and combinatorics, without requiring knowledge of university-level material. Approximately half the contestants receive medals, with gold, silver, and bronze distributed in a 1:2:3 ratio.

*The International Physics Olympiad (IPhO)* was first held in Poland in 1967, inspired by the success of the IMO. It now includes more than 80 countries, each sending up to five high school students. The competition is designed to test mastery of theoretical and experimental physics, as well as problem-solving and analytical skills. It consists of two examinations: a five-hour theoretical exam with three problems and a five-hour practical exam with one or two experimental tasks. Gold, silver, and bronze medals are awarded to the top 8%, 25%, and 50% of participants respectively, and distinctions extend to about two-thirds of the competitors through honorable mentions.

*The International Chemistry Olympiad (IChO)* was first held in 1968 and has grown to include more than 80 participating countries. Each nation may send a team of up to four students. The competition spans two days: one day devoted to a five-hour laboratory practical exam and another to a five-hour written theoretical exam. Awards are distributed according to performance tiers: gold medals go to the top 12% of students, silver to the next 22%, and bronze to the following 32%, while honorable mentions are given to the top 10% of non-medalists.

*The International Olympiad in Informatics (IOI)*, launched in Bulgaria in 1989, is the leading global competition in programming and algorithmic problem-solving for secondary school students. More than 80 countries participate annually, each represented by up to four students. The contest consists of two five-hour sessions held on separate days, with students solving three programming problems per session, typically in C++. Scores are aggregated across both days, and medals are awarded to the top 50% of competitors in a 1:2:3 ratio.

*The International Biology Olympiad (IBO)* was established in Czechoslovakia in 1990 and today includes more than 70 countries. Each national team consists of four students, usually the winners of national biology competitions, and students may compete at most twice. The competition consists of theoretical and practical components, each accounting for half the final score. The theoretical exam covers areas such as cell biology, physiology, genetics and evolution, ecology, and biosystematics, while the practical component requires students to conduct experiments and analyze data in laboratory settings. Participants are ranked by combined performance, with medals awarded to the top 60% in a 1:2:3 ratio and certificates of merit given to the top 25% of non-medalists.

Together, these Olympiads provide a rich and standardized setting for identifying exceptional talent across disciplines. Their global reach, rigorous selection processes, and long history make them uniquely valuable for studying the link between early excellence and later scientific achievement.

## 3 Data and Methods

A key challenge in studying how early achievements—such as high school competition results—predict career outcomes is the absence of comprehensive, longitudinal data. Ideally, one would track large cohorts of students from high school through their careers, observing who goes on to make contributions in science and engineering and linking these contributions to observable characteristics such as grades or competition results. In practice, however, privacy laws and record linkage limitations make constructing such datasets extremely difficult.

To address this challenge, we developed an original dataset that leverages publicly available information, in particular the individual results publicly announced by the International Science Olympiads.

*Olympiad Database.* Using the official websites of the five International Science Olympiads—

mathematics, physics, chemistry, informatics, and biology—we constructed a database of all past participants between 1959 and 2022.

Figure 1 shows the cumulative number of participants to the five major science Olympiads (IMO, IOI, IPhO, IChO, and IBO) by country from 1959 onwards. The figure highlights a steady increase in the total number of Olympiad participants over time (black line). For each participant, our dataset includes name, year of participation, country represented, and result obtained. Accounting for multiple participations, the database covers 37,244 individuals from 141 countries. Because year of birth is not directly available, we impute it as 18 years before the individual's last Olympiad participation. Since our focus is on prize winners born after 1970, we restrict the risk set to Olympiad medalists who obtained a medal after 1988.

*Scientific Prizes Database.* To examine long-term scientific contributions, we focus on major scientific prizes. Prizes are an attractive measure of contribution to science because they are awarded following careful selection procedures and reflect recognition of scientists by their community. To identify major scientific prizes, we follow established methods in the literature based on daily views on the corresponding Wikipedia pages (Ma and Uzzi, 2018). This procedure yields a list of 141 awards across mathematics, physics, chemistry, computer science and engineering, and the life sciences.

From this list, we collected information on all prize recipients between 2010 and 2023, yielding 2,125 individuals. Our main interest is in younger prize winners, and so we focus on those born after 1970 (n = 1,344), since the International Science Olympiads only achieved significant popularity from the 1990s onward.

*Scientific Prize Recipients Database.* For each prize recipient, we identified year of birth using Wikipedia, professional biographies, and other online resources. In 77.8% of cases, year of birth was found directly. For the remaining individuals, we located their year of PhD and imputed year of birth assuming an average age of 27 at PhD. There were six individuals (0.3% of the sample) for whom neither birth year nor PhD year could be identified; these were dropped. Our final dataset includes 577 prize winners, accounting for a total of 672 prizes, born after 1970.

In addition, we collected information on the educational background of prize recipients, with particular attention to the universities where they obtained their undergraduate degrees, and recorded whether they had participated in any International Science Olympiad.

*Matching Olympiad Participants to Prize Recipients.* We matched the Olympiad participant records to the list of scientific prize recipients. While name disambiguation requires care, the matching is relatively straightforward because we know both populations: the complete set of International Science Olympiad participants and the complete set of prize winners. This enables us to identify not only the small subset of Olympiad medalists who later win prizes, but also the much larger population of medalists who do not—providing a clearly defined risk set for analysis.

*Olympiad Medalists Risk Set.* The Olympiad data allows us to define the population of medalists, including both the subset who eventually win scientific prizes and the majority who do not. Because year of birth is not directly observed, we impute it as 18 years before the last Olympiad participation. Consistent with our focus on prize winners born after 1970, we restrict the risk set to medalists who obtained their medals after 1988.

*Undergraduate Alumni Risk Set.* As an additional benchmark, we consider undergraduate alumni from leading global universities. While there is no systematic dataset covering the population of undergraduate alumni, we estimate the number of students using publicly available institutional statistics. This allows us to calculate the rate at which undergraduates at elite universities go on to win scientific prizes, and to compare this rate to that of Olympiad medalists.

# 4 Results

## 4.1 How Much Do Olympiad Medalists Contribute to the Advancement of the Knowledge Frontier?

We are particularly interested in understanding the extent to which Olympiad medalists contribute to advancing the knowledge frontier. To measure this empirically, we use the custom-built database of scientific prize winners described in the preceding section. Overall, we find that 10% (138 out of 1,344) of scientific prizes awarded in our sample have been won by medalists from one of the five International Science Olympiads (see Fig. 2). The share of prizes won by Olympiad medalists is highest in computer science and engineering (18%), followed by mathematics (15%) and physics (6%), and much lower in chemistry and life sciences (1% each).

Two pieces of context are useful to put this number in perspective. First, the popularity of the Olympiads is a relatively new phenomenon, and scientific achievements naturally lag high-school age results by quite a few years. Second, the number of individuals participating in the international Olympiads is in the hundreds (or low thousands in recent years).

Distinguishing between the competitions reveals that IMO medalists alone have won 8% of scientific prizes, or 80 percent of the awards won by Olympiad medalists. This reflects the success of IMO medalists in winning mathematics awards but IMO medalists have also been successful in winning prizes outside mathematics. In physics, for instance, IMO medalists have won more prizes than medalists from physics and all other Olympiads combined. In computer science and engineering, IOI medalists won the majority of awards given to Olympiad medalists, but IMO medalists are a sizeable minority.

While the prevalence of prizes may vary across scientific fields, this can hardly explain the disproportionate share of prizes won by IMO medalists, as they also win a disproportionate share of the non-math awards. However, it is possible that discoveries in mathematics and mathematics-adjacent fields may happen (and be recognized) earlier in the life-cycle compared to chemistry or biology (Fig. S1). As time accumulates, further evidence on the predictive power of chemistry and biology Olympiad medals may emerge.

### 4.2 How Likely Are Olympiad Medalists to Advance the Knowledge Frontier?

It is striking that Olympiad medalists, a group that numbers only hundreds per year, win a sizeable share of scientific awards. But exactly how likely are Olympiad medalists to win a scientific prize compared to other groups?

To establish a benchmark, we first consider the undergraduate alumni from ten leading global universities and the share of those winning scientific prizes (see Fig. 3 panel #1). At MIT for instance, one in 2,000 undergraduate students goes on to win a major scientific prize. Given that MIT's undergraduate intake is slightly above 1,000, it takes on average two cohorts of MIT undergraduate students to generate one subsequent scientific prize winner. Across the group of 10 leading global universities, one in 4,500 undergraduate students becomes a scientific prize winner.

### 4.3 Which Science Olympiads Are Most Predictive of Future Breakthroughs?

We complement the evidence on the number of awards won by considering the ratio of awards to the number of individuals participating in each competition. We compute these numbers separately for all five competitions and medal categories (gold, silver, and bronze). For comparison, we also consider the number of awards won by undergraduate alumni from 10 leading global universities relative to their total alumni numbers.

Among Olympiads, the International Mathematical Olympiad (IMO) is the strongest predictor: one in 40 IMO gold medalists wins a major science prize, 50 times higher than MIT undergraduates or 115 times higher than top 10 alumni (Fig. 3 panel #3). The International Olympiad in Informatics (IOI) is the second-best predictor with IOI gold medalists winning prizes at a rate 65 times higher than top 10 alumni.

When we distinguish among IMO medalists (Fig 3, panel #4), IMO gold medalists are about 2.5 times more likely to win a scientific prize compared to IMO silver medalists, and six times more likely than IMO bronze medalists. However, an IMO bronze medalist is still 20 times more likely to win a scientific prize than a top 10 undergraduate alumni. Finally, an IMO bronze medalist is twice as likely to go on and win a scientific prize as a physics or chemistry gold medalist.

Overall, the evidence suggests that Olympiad medalists, especially those with a gold medal and from mathematics, are far more likely to win scientific prizes than the highly selected group of undergraduates alumni from top 10 universities.

## 5 Discussion

Surprisingly little evidence exists on whether and how we might identify, at an early stage, individuals with exceptional potential to advance the knowledge frontier. This paper has examined the role of high school competitions as a tool for discovering such individuals. Our findings show that excellence in Olympiads predicts receiving scientific awards for outstanding contributions in science and mathematics. While Olympiad performance correlates with STEM excellence across different disciplines, it is most predictive in mathematics and informatics.

Traditionally, science and technology policies focus on supporting those who have already established scientific careers, through grants, fellowships, prizes, or similar forms of support (Bloom et al., 2019; Stephan, 2010). However, there is growing recognition of the importance of expanding the pool of individuals who enter scientific careers by intervening earlier. Some policymakers might seek to address underrepresentation in STEM fields, while others may be motivated by efficiency considerations, such as improving the quality and size of the STEM workforce. Early interventions, when well-targeted, hold promise for both broadening participation and enhancing efficiency, especially when such interventions are expensive on a per-individual basis. By using Olympiads as an identification tool, policymakers and institutions can direct early resources to individuals with the strongest potential, helping to allocate competitive university placements, fellowships, or even structured exposure to STEM careers and innovation environments.

Some studies suggest that interventions exposing young talent to high-level scientific or innovation-focused environments can encourage careers in these fields (Bloom et al., 2019). Yet, such programs can be costly on a per-student basis, limiting the scale at which they can be implemented. Programs like summer sessions at prestigious institutions (e.g., MIT) involve high logistical costs, especially if they require travel, accommodation, and tailored mentoring for each student. Identifying exceptional talent through Olympiads offers a way to narrow the selection to those with a demonstrated aptitude for STEM, making such "exposure-to-innovation" interventions more targeted and cost-effective. By focusing resources on high-potential students, we maximize the impact and efficiency of these initiatives, potentially increasing the likelihood of nurturing future innovators and scientific leaders.

While competitions appear to be useful for identifying young individuals with strong potential in STEM, they have certain limitations. First, some gifted individuals may be less inclined toward competition and thus might avoid Olympiads altogether. For example, women have historically been underrepresented in these competitions. Historically, less than 10 percent of participants in the IMO have been women. There may be ways to make competitions more inclusive and appealing to women, such as through female-only competitions. Ultimately, however, Olympiads are competitions that may be unappealing to certain individuals and groups. Second, access to Olympiads varies widely, with talented students in some regions lacking opportunities due to limited awareness, financial constraints, or lack of access to competitions. In some developing regions, such as parts of Africa, competition reach is limited, and in other countries, participation fees may pose a barrier. Third, preparing for Olympiads requires a significant time commitment, which may come at the expense of other academic pursuits or personal enrichment activities.

These limitations may put a premium on investing in Olympiad infrastructure and mathematics education to broaden and deepen the talent pipeline. This could include establishing Olympiad programs in underserved countries, creating more inclusive formats, such as regional Olympiads or girls-only Olympiads (e.g., the European Girls' Mathematical Olympiad, or EGMO), and improving training (Stephan, 2010; Cohodes et al., 2024; Calaway, 2024). Such investments would make competitions and mathematics more accessible and appealing, ensuring that more young talent has the opportunity to participate and excel. Additionally, it may be worthwhile to explore other technologies beyond competitions that could support early talent identification.

We conclude by noting a few open questions. One key question is why mathematics competitions, in particular, appear to be more predictive of individuals' ability to push the knowledge frontier. A simple explanation might be that knowledge production in fields outside of mathematics is more reliant on external factors, such as access to physical resources or even luck. However, this explanation is not consistent with the fact that individuals who excel in mathematics competitions often go on to win scientific prizes in diverse fields beyond mathematics. Another possibility is that the types of problems presented in mathematics competitions are better suited to capturing certain dimensions of intellectual ability that correlate strongly with scientific excellence. A third, more practical, explanation is that mathematics competitions reach a larger pool of participants, as they have established longer traditions, are more widely accessible, and require minimal resources beyond pen and paper. This larger pool may result in stronger talent being identified among mathematics Olympiad medalists. Further research to explore these hypotheses would help clarify why mathematics competitions are more effective at identifying future leaders in science.

A second question is whether the relationship between high school competition success and later scientific achievement reflects more than mere correlation. On one hand, developing advanced problem-solving skills as a teenager could directly enhance one's ability to contribute to knowledge production later in life. On the other hand, success in competitions may encourage young people to continue pursuing science, either by building their confidence (Ellison and Swanson, 2016) or by granting access to new opportunities, such as scholarships to top universities. While our study has focused on high school competition results as predictors of future scientific success, establishing a causal link would provide additional justification for policymakers to support the development and expansion of such competitions.

Finally, much remains to be learned about other forms of talent identification, both in isolation and in comparison to competitions. High school students often go through various assessments, such as standardized exit exams or university entrance exams, but the extent to which these scores predict long-term excellence is unclear. Similarly, could extracurricular activities—such as chess, music, or summer research projects—serve as indicators of high potential? Further research into these various identification methods is essential for ensuring that exceptional talent is recognized and nurtured. By advancing our understanding of how to identify and develop young talent, we can better leverage human potential to drive progress in science, innovation, and economic growth.

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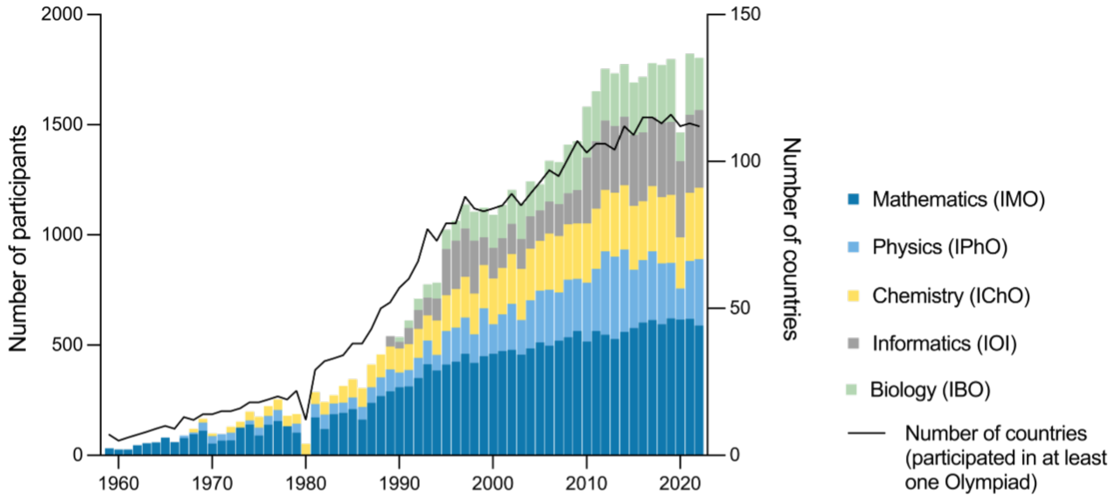


Figure 1: Participation in the International Science Olympiads

*Note:* This figure includes data on all participants and participating countries of the five Olympiads (IMO, IPhO, IChO, IOI, and IBO) from 1959 to 2022. The stacked bars demonstrate the number of participants in each Olympiad and the line shows the number of countries that participated in at least one Olympiad. Roughly half of the Olympiad participants win medals, and one sixth win gold medals.

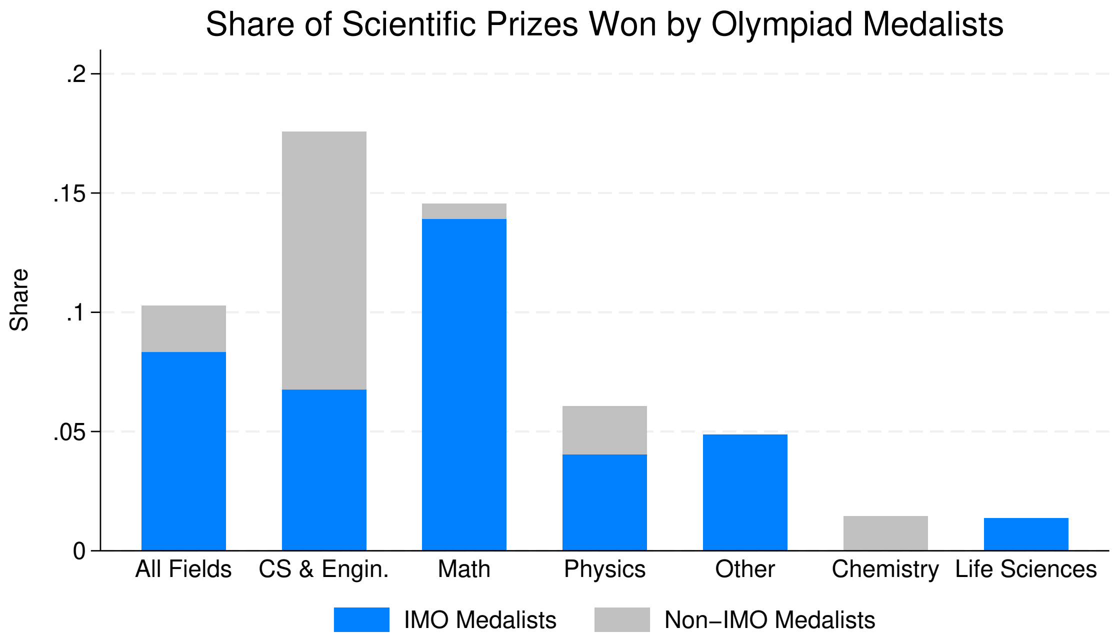


Figure 2: Share of Scientific Prizes Won by Olympiad Medalists

*Note:* This figure is based on our database of 1,344 winners of major scientific prizes born after 1970. The blue bars show the share of prizes awarded to individuals who have won medals at the International Mathematics Olympiad (IMO). The gray bar shows the share of prizes awarded to individuals who have medals in one of the other science Olympiad.

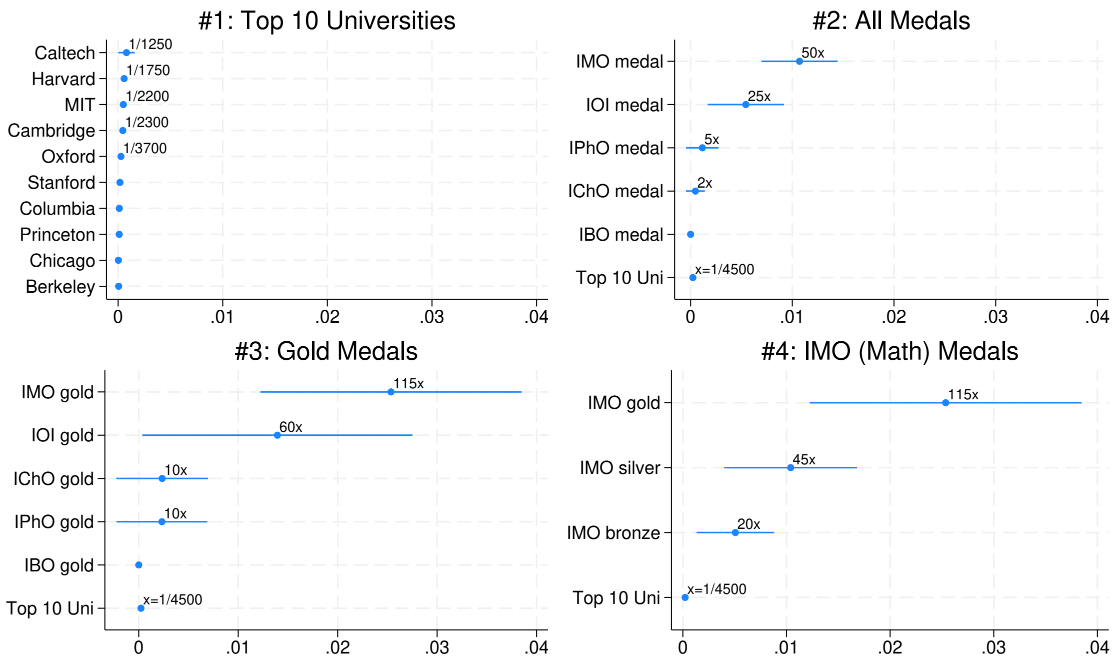


Figure 3: Share of Alumni and Olympiad Medalists Winning Scientific Prizes

*Note:* In this figure we show the share of individuals winning scientific prizes. For panel #1, this corresponds to the number of (undergraduate) alumni winning scientific prizes divided by the number of undergraduate alumni from these universities. For panels #2 - #4, this corresponds to the number of Olympiad medalists (in a given Olympiad and/or medal category) with subsequent prizes divided by the number of Olympiad medalists (in a given Olympiad and/or medal category). In all cases we consider individuals who enter university/do the last their Olympiad between 1989 and 2008.

# Appendix

Table A1: List of Scientific Prizes

| Prize | Field |
|---|---|
| ACS Award in Pure Chemistry | Chemistry |
| Albert Einstein World Award of Science | Chemistry |
| Arthur C. Cope Award | Chemistry |
| Charles Goodyear Medal | Chemistry |
| Davy Medal | Chemistry |
| Faraday Lectureship Prize | Chemistry |
| Franklin Institute Awards | Chemistry |
| Harrison-Meldola Memorial Prizes | Chemistry |
| Hickinbottom Award | Chemistry |
| Irving Langmuir Award | Chemistry |
| Linus Pauling Award | Chemistry |
| Nobel Prize in Chemistry | Chemistry |
| Othmer Gold Medal | Chemistry |
| Perkin Medal | Chemistry |
| Priestley Medal | Chemistry |
| Welch Award in Chemistry | Chemistry |
| Willard Gibbs Award | Chemistry |
| Wolf Prize in Chemistry | Chemistry |
| ACM Doctoral Dissertation Award | Computer Science & Eng. |
| ACM Prize in Computing | Computer Science & Eng. |
| ASME Medal | Computer Science & Eng. |
| Charles Stark Draper Prize | Computer Science & Eng. |
| Faraday Medal | Computer Science & Eng. |
| Franklin Institute Awards | Computer Science & Eng. |
| Grace Murray Hopper Award | Computer Science & Eng. |
| IEEE Medal of Honor | Computer Science & Eng. |
| IEEE Robotics and Automation Award | Computer Science & Eng. |
| IJCAI Computers and Thought Award | Computer Science & Eng. |
| IMU Abacus Medal | Computer Science & Eng. |

| Prize | Field |
|---|---|
| James Watt International Gold Medal | Computer Science & Eng. |
| John Fritz Medal | Computer Science & Eng. |
| Presburger Award | Computer Science & Eng. |
| Queen Elizabeth Prize for Engineering | Computer Science & Eng. |
| Richard E. Bellman Control Heritage Award | Computer Science & Eng. |
| Timoshenko Medal | Computer Science & Eng. |
| Albert Einstein World Award of Science | Life Sciences |
| Bicentenary Medal of the Linnean Society | Life Sciences |
| Colworth Medal | Life Sciences |
| Crafoord Prize | Life Sciences |
| EMBO Gold Medal | Life Sciences |
| Franklin Institute Awards | Life Sciences |
| Kavli Prize | Life Sciences |
| Kyoto Prize in Basic Sciences | Life Sciences |
| NAS Award in Molecular Biology | Life Sciences |
| Overton Prize | Life Sciences |
| Richard Lounsbery Award | Life Sciences |
| Robert H. MacArthur Award | Life Sciences |
| Shaw Prize | Life Sciences |
| Abel Prize | Math |
| Adams Prize | Math |
| Berwick Prize | Math |
| Breakthrough Prize in Mathematics | Math |
| Bocher Memorial Prize | Math |
| COPSS Presidents' Award | Math |
| Chauvenet Prize | Math |
| Clay Research Award | Math |
| Cole Prize | Math |
| Copley Medal | Math |
| Crafoord Prize | Math |
| De Morgan Medal | Math |

| Prize | Field |
|---|---|
| E. W. Beth Dissertation Prize | Math |
| Fermat Prize | Math |
| Fields Medal | Math |
| Fulkerson Prize | Math |
| Guy Medal (Bronze) | Math |
| Guy Medal (Gold) | Math |
| Guy Medal (Silver) | Math |
| ICTP Ramanujan Prize | Math |
| J. H. Wilkinson Prize for Numerical Software | Math |
| John von Neumann Theory Prize | Math |
| Kyoto Prize in Basic Sciences | Math |
| Leroy P. Steele Prize | Math |
| Leslie Fox Prize for Numerical Analysis | Math |
| Levi L. Conant Prize | Math |
| Loeve Prize | Math |
| Michael Brin Prize in Dynamical Systems | Math |
| Naylor Prize and Lectureship | Math |
| Nemmers Prize in Mathematics | Math |
| Noether Lecture | Math |
| Norbert Wiener Prize in Applied Mathematics | Math |
| Ostrowski Prize | Math |
| Oswald Veblen Prize in Geometry | Math |
| Polya Prize (LMS) | Math |
| R. A. Fisher Lectureship | Math |
| Ramanujan Prize | Math |
| Rolf Schock Prize in Mathematics | Math |
| Rollo Davidson Prize | Math |
| Ruth Lyttle Satter Prize in Mathematics | Math |
| Salem Prize | Math |
| Senior Berwick Prize | Math |

| **Prize** | **Field** |
|---|---|
| Shaw Prize | Math |
| Sylvester Medal | Math |
| Whitehead Prize | Math |
| Wolf Prize in Mathematics | Math |
| Albert Einstein Medal | Other |
| Copley Medal | Other |
| Crafoord Prize | Other |
| Franklin Institute Awards | Other |
| Kyoto Prize in Basic Sciences | Other |
| Lemelson–MIT Prize | Other |
| Lieben Prize | Other |
| Millennium Technology Prize | Other |
| Sackler Prize | Other |
| Wayne B. Nottingham Prize | Other |
| Albert Einstein World Award of Science | Physics |
| Andrew Gemant Award | Physics |
| Boltzmann Medal | Physics |
| Breakthrough Prize in Fundamental Physics | Physics |
| Comstock Prize in Physics | Physics |
| Crafoord Prize | Physics |
| Dannie Heineman Prize for Astrophysics | Physics |
| Dannie Heineman Prize for Mathematical Physics | Physics |
| Eddington Medal | Physics |
| Einstein Prize | Physics |
| Feynman Prize in Nanotechnology | Physics |
| Franklin Institute Awards | Physics |
| Gregori Aminoff Prize | Physics |
| Gruber Prize in Cosmology | Physics |
| Henri Poincare Prize | Physics |
| Henry Draper Medal | Physics |

| **Prize** | **Field** |
|---|---|
| Hughes Medal | Physics |
| Institute of Physics Isaac Newton Medal | Physics |
| Kavli Prize | Physics |
| Klopsteg Memorial Award | Physics |
| Lars Onsager Prize | Physics |
| Lilienfeld Prize | Physics |
| Lorentz Medal | Physics |
| Luigi G. Napolitano Award | Physics |
| Matteucci Medal | Physics |
| Max Planck Medal | Physics |
| New Horizons in Physics Prize | Physics |
| Nobel Prize in Physics | Physics |
| Oliver E. Buckley Condensed Matter Prize | Physics |
| Oskar Klein Memorial Lecture | Physics |
| Panofsky Prize | Physics |
| Pomeranchuk Prize | Physics |
| Rumford Medal | Physics |
| Rumford Prize | Physics |
| Sakurai Prize | Physics |
| Shaw Prize | Physics |
| Wolf Prize in Physics | Physics |

Table A2: Scientific Prizes won by Olympiad Medalists

| **Field** | **IMO** | **IPhO** | **IChO** | **IBO** | **IOI** | **Total** |
|---|---|---|---|---|---|---|
| Life Sciences | 1 | | | | | 1 |
| Chemistry | | | 1 | | | 1 |
| Computer Science & Eng. | 5 | | | | 8 | 13 |
| Math | 43 | | | | 2 | 45 |
| Other | 2 | | | | | 2 |
| Physics | 4 | 2 | | | | 6 |
| **Total** | **55** | **2** | **1** | **0** | **10** | |

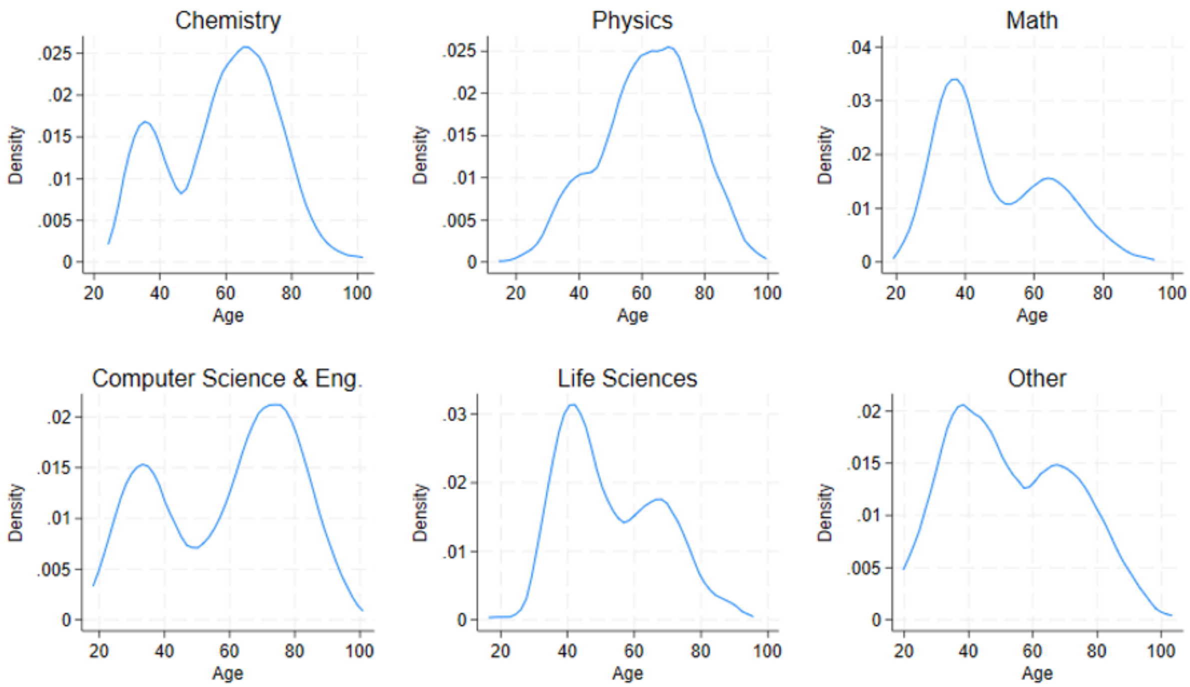


Figure S1: Distribution of age at award by field