



A New Future for K-12 CS Education: Why You Should Care

**Bobby Schnabel, Indiana University and
Chair, ACM Education Policy Committee**



Association for
Computing Machinery

Advancing Computing as a Science & Profession.

Organization of Session

- **Bobby Schnabel: *Introduction, Context***
- **Chris Stephenson, Computer Science Teachers Association: *Motivation, current status, national need***
- **Cameron Wilson, ACM: *Policy challenges, community response***
- **Jan Cuny, NSF: *Community effort to reform AP / high school CS***
- **Lucy Sanders, National Center for Women & Info. Tech'y: *Importance of all parts, and what you can do***

DISCUSSION

K-12 Computer Science Education



Strong interest recently from:

- **Government Leaders**
- **Popular Press**
- **Computing Research Community**

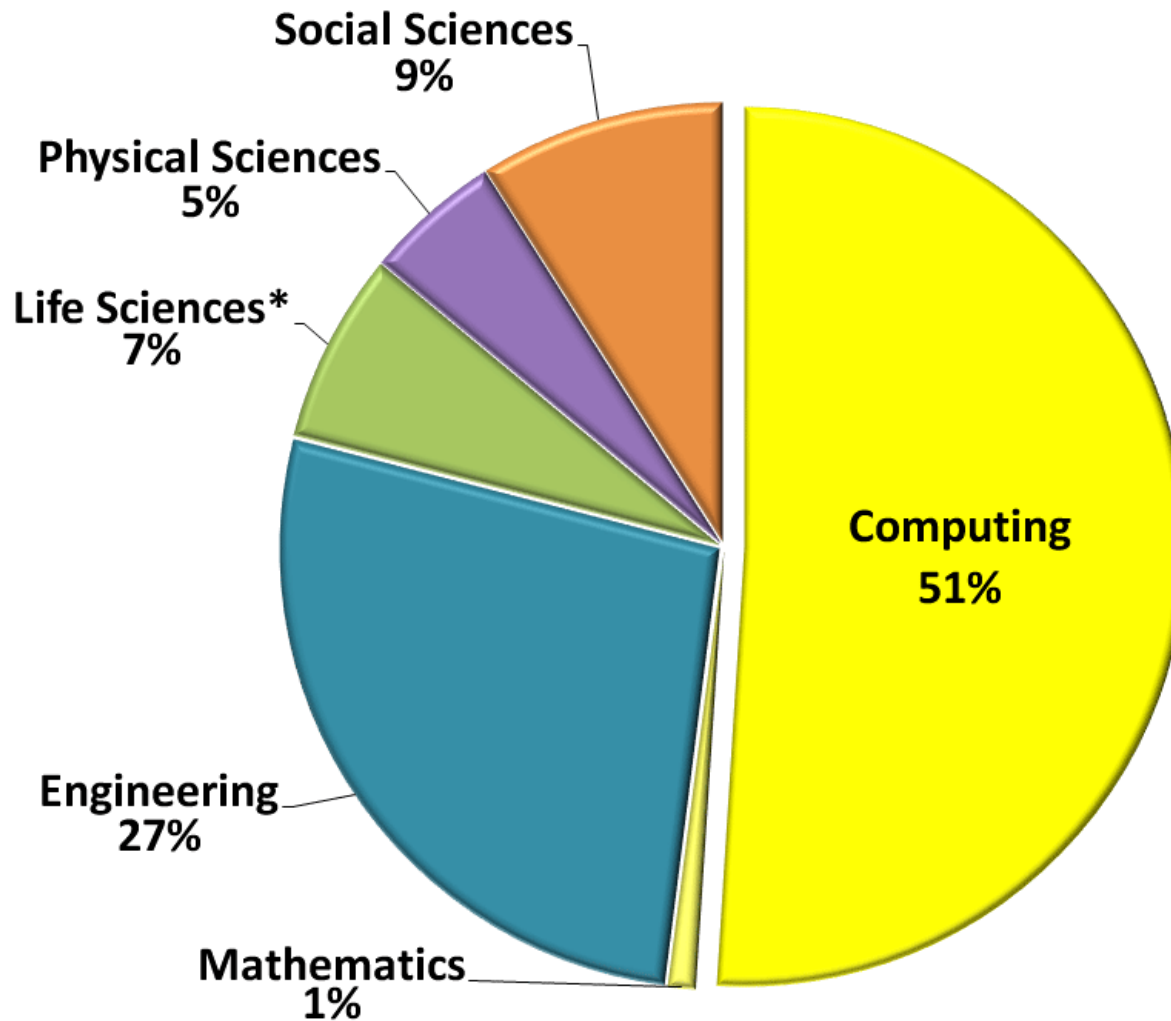
WHY?

Reasons for Interest in K-12 CS Education

- **Large demand for computing professionals**
- **Number of university / college computer science graduates falls far short of current and projected demand**
- **K-12 doing very little to expose students to rigorous computer science**

Where the STEM Jobs Will Be

Projected Annual Growth of Total STEM Job Openings 2010-2020



* STEM is defined here to include non-medical occupations.



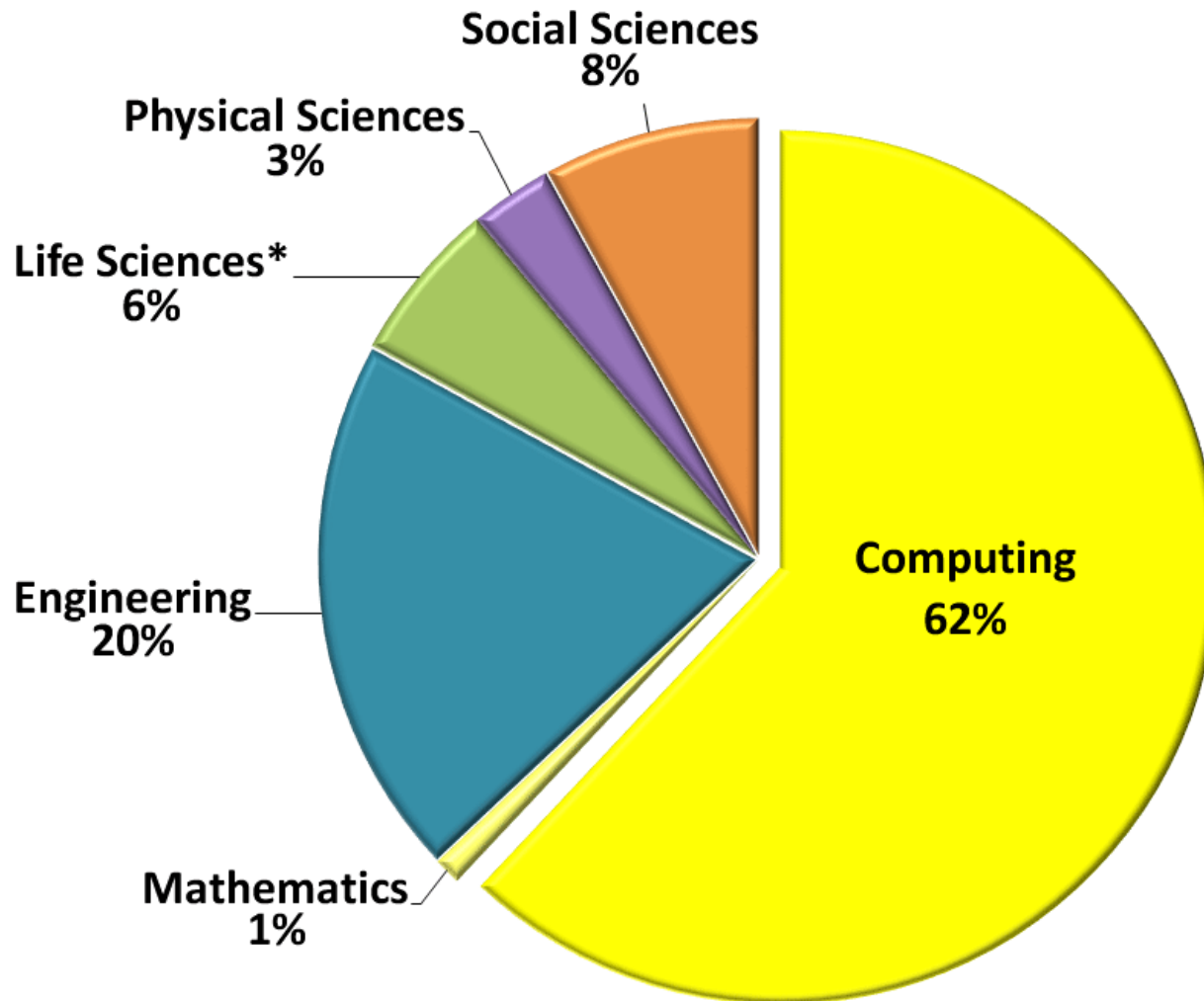
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Source: Jobs data are calculated from the Bureau of Labor Statistics (BLS), Employment Projections 2010-2020, available at <http://www.bls.gov/emp/>.

Where the STEM Jobs Will Be

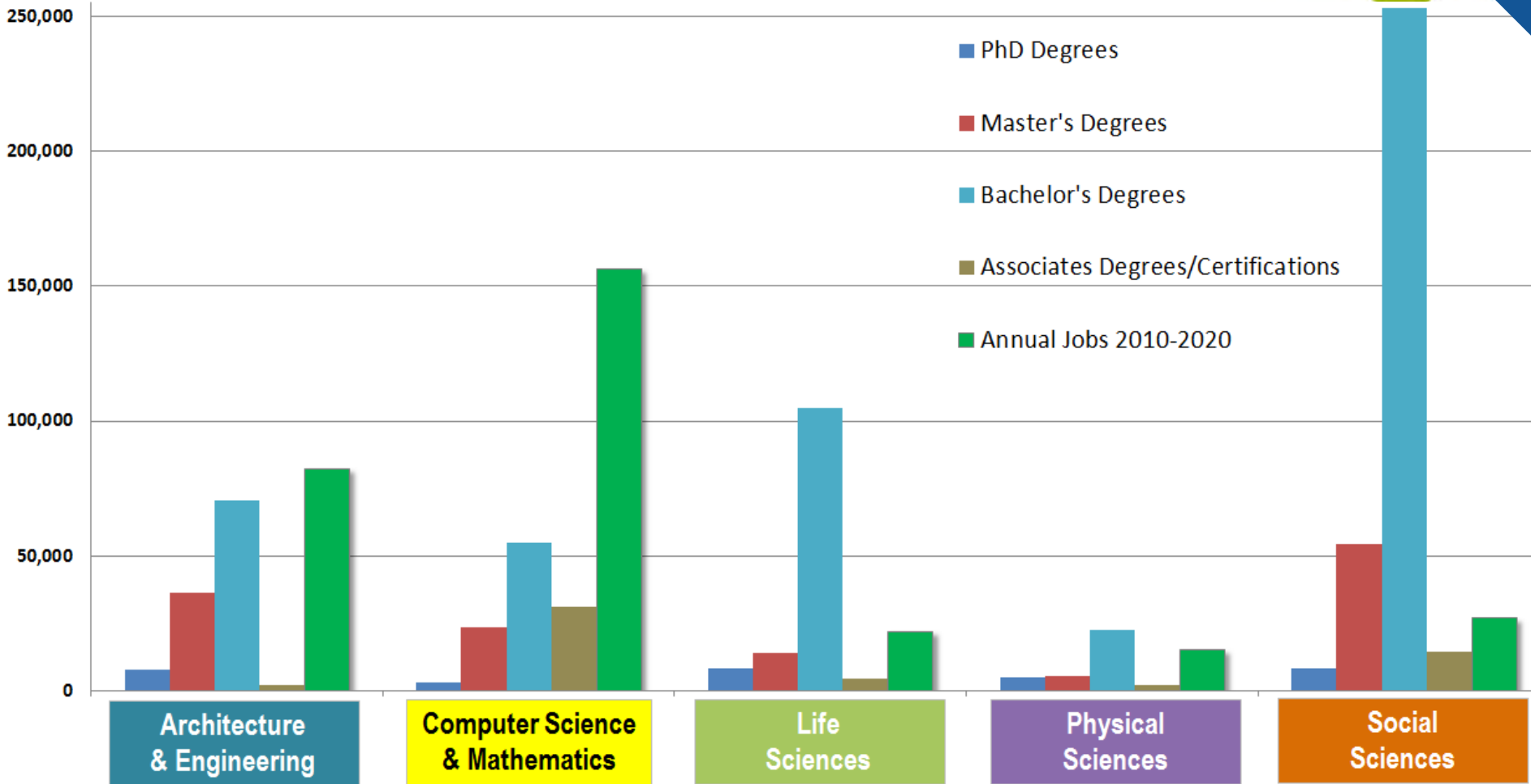
Projected Annual Growth of **NEWLY CREATED** STEM Job Openings 2010-2020



* STEM is defined here to include non-medical occupations.

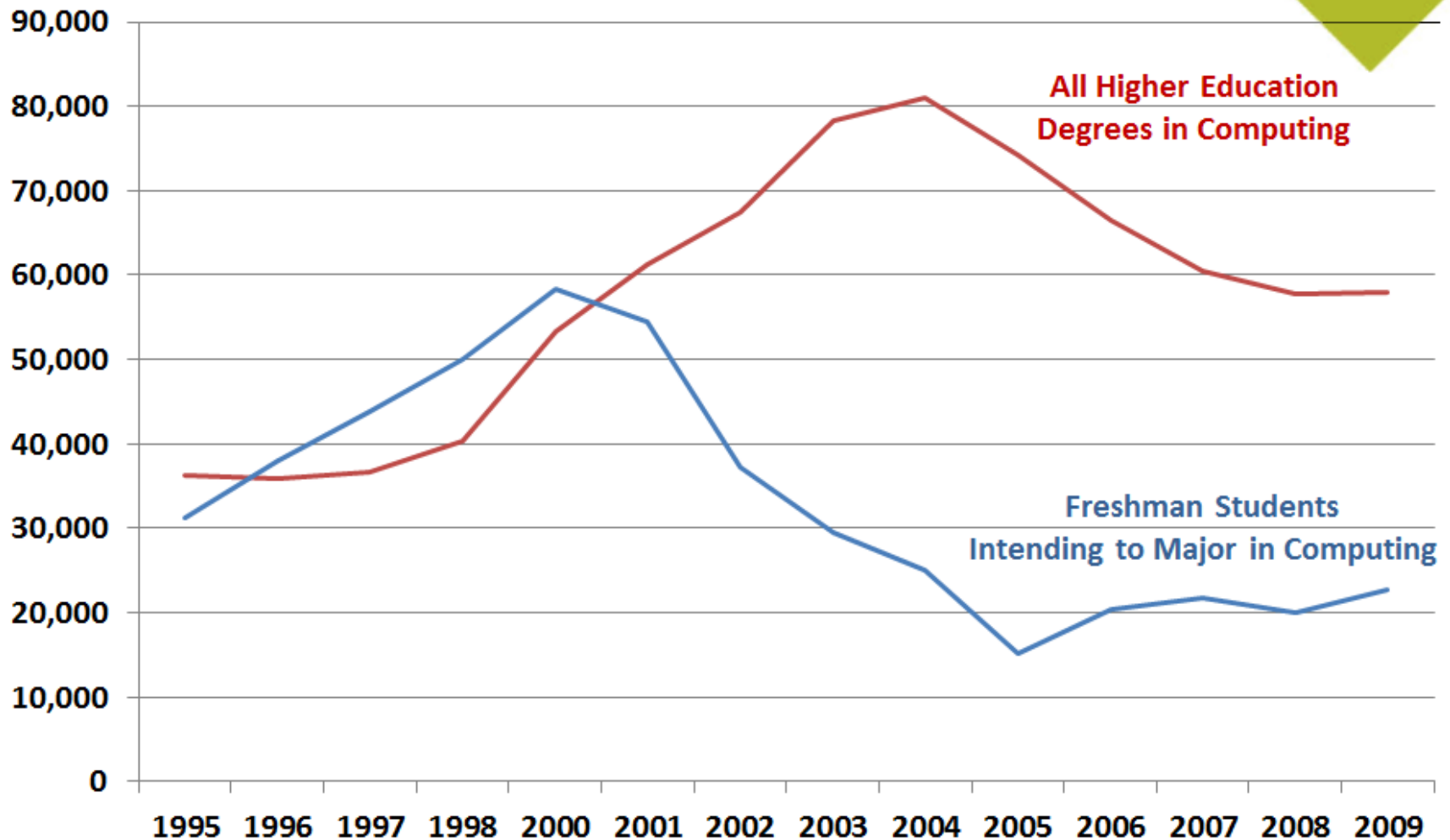
Where the STEM Jobs Will Be

Degrees vs. Jobs Annually



Sources: Degree data are calculated from the National Science Foundation (NSF), Science and Engineering Indicators 2012, available at <http://www.nsf.gov/statistics/seind12/appendix.htm>. Annual jobs data are calculated from the Bureau of Labor Statistics (BLS), Employment Projections 2010-2020, available at <http://www.bls.gov/emp/>. STEM is defined here to include non-medical degrees and occupations.

Higher Education Pipeline in Computing



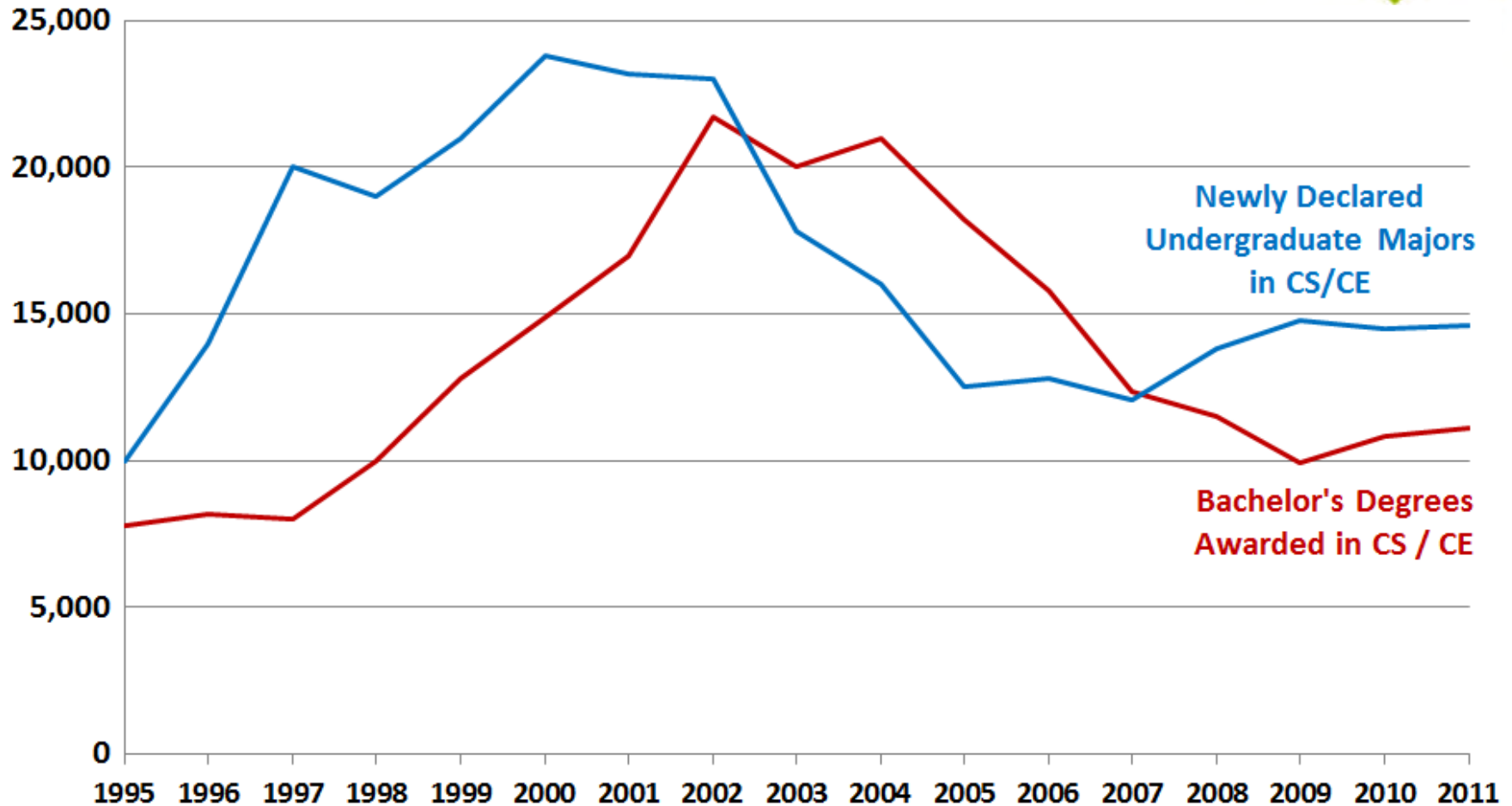
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Source: National Science Foundation, Science and Engineering Indicators 2012 and various years, available at <http://www.nsf.gov/statistics/seind12/>. Data are not available from 1999.

Higher Education Pipeline in Computing

CRA Taulbee Survey Results



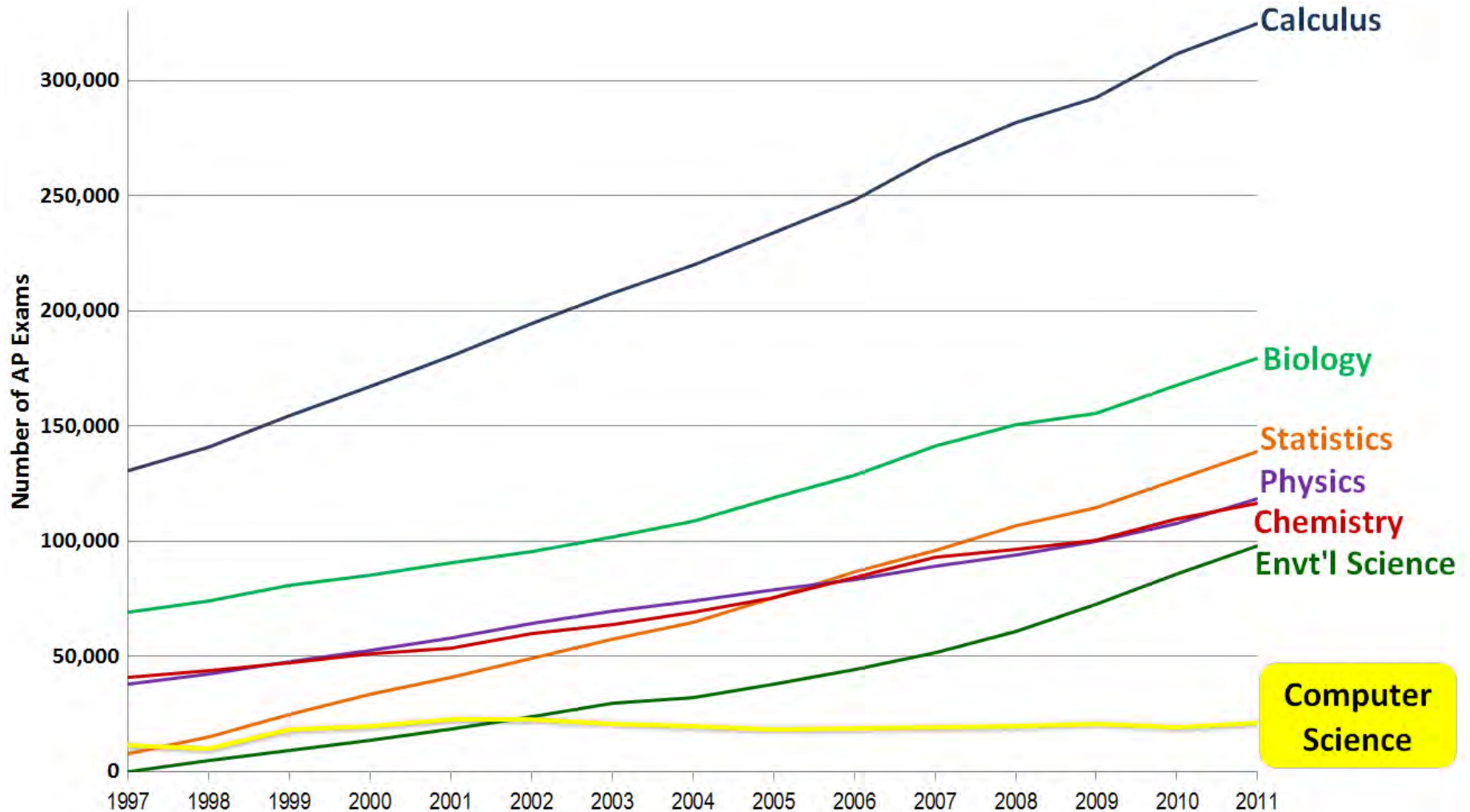
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Source: Computing Research Association, Taulbee Survey 2010-2011, available at <http://www.cra.org/resources/taulbee/> (providing voluntary responses from Ph.D.-granting universities on new enrollments and degrees awarded in their undergraduate CS/CE programs).

High School Advanced Placement

Exams 1997-2011



Source: College Board, Advanced Placement (AP) Exam Data 2011, available at <http://professionals.collegeboard.com/data-reports-research/ap/data>. Calculus represents the combined data of Calculus AB and BC. Physics represents the combined data of Physics B, C:Electricity and Magnetism, and C:Mechanics. Computer Science represents combined data of Computer Science A and B. July 2012

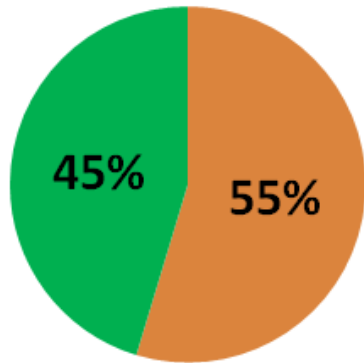
High School Advanced Placement

Male

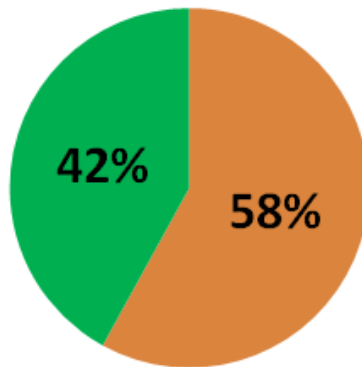
Exams 2011

Female

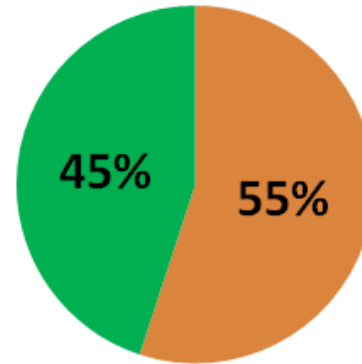
Total AP Tests



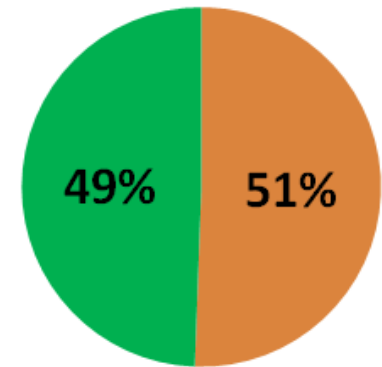
Biology



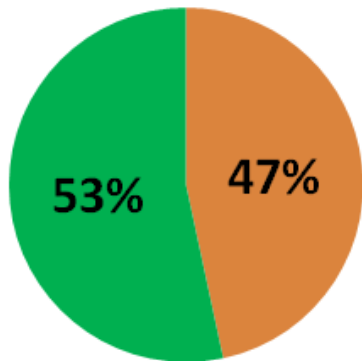
Environmental Science



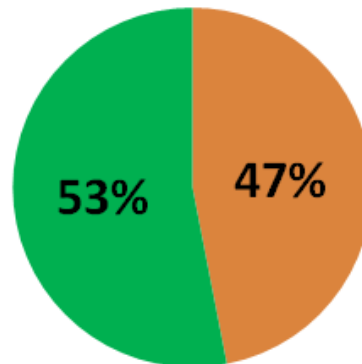
Statistics



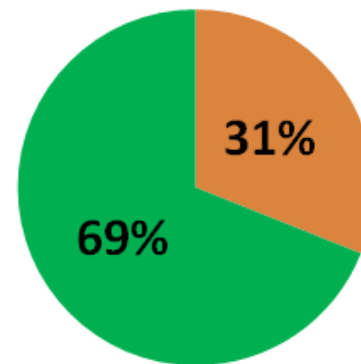
Calculus



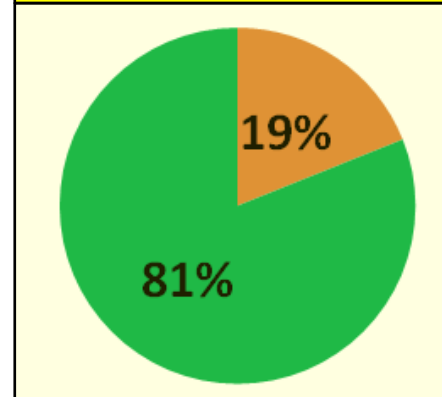
Chemistry



Physics

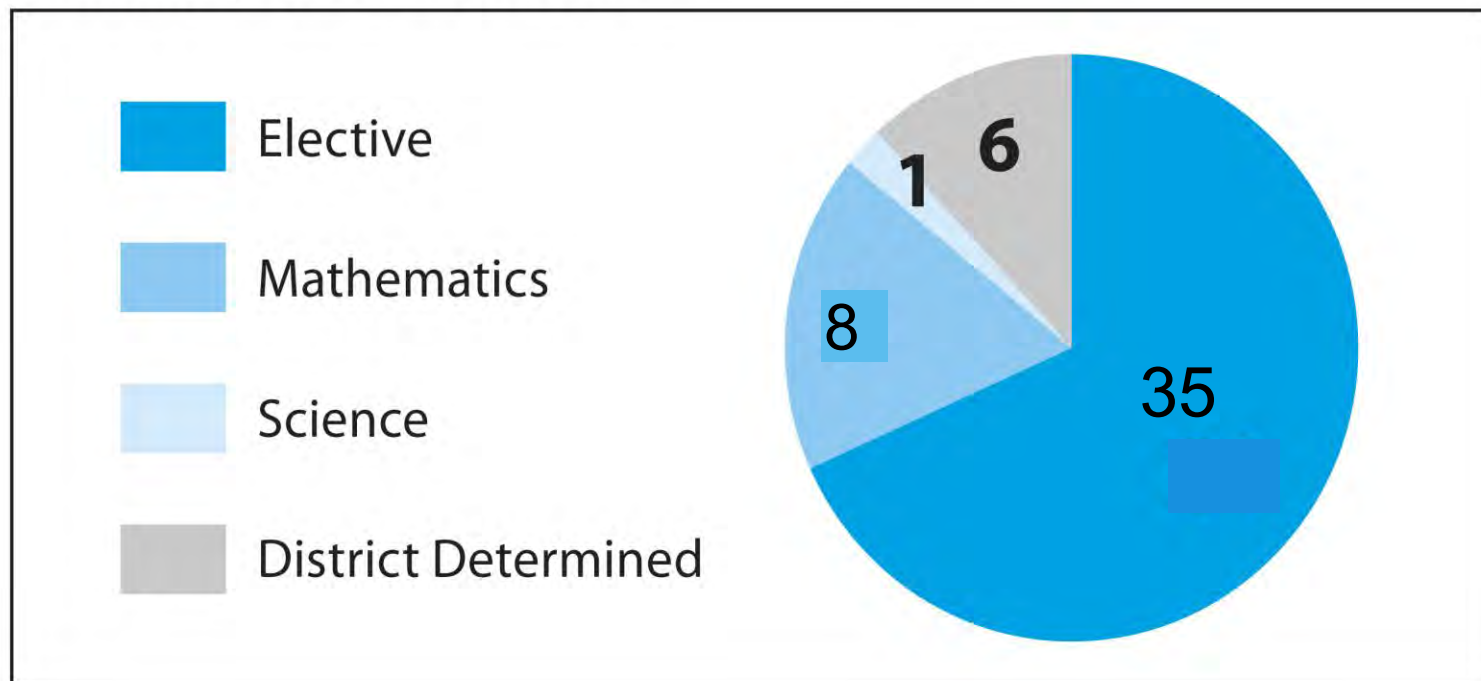


Computer Science



How Computer Science “Counts” In K-12

FIGURE 12 How Computer Science Courses Count Toward Graduation Requirements



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