

# The Job Markets for Master's and Doctorate Bioscience Graduates

Challenges Facing  
Professional Science  
Master's Programs

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# Example of the Bioinformatics Job Market

- Acknowledgements:
  - Joint work with Paula Stephan
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- Methodology:
  - Survey of bioinformatics related academic programs
  - Analysis of job ads in *Science*

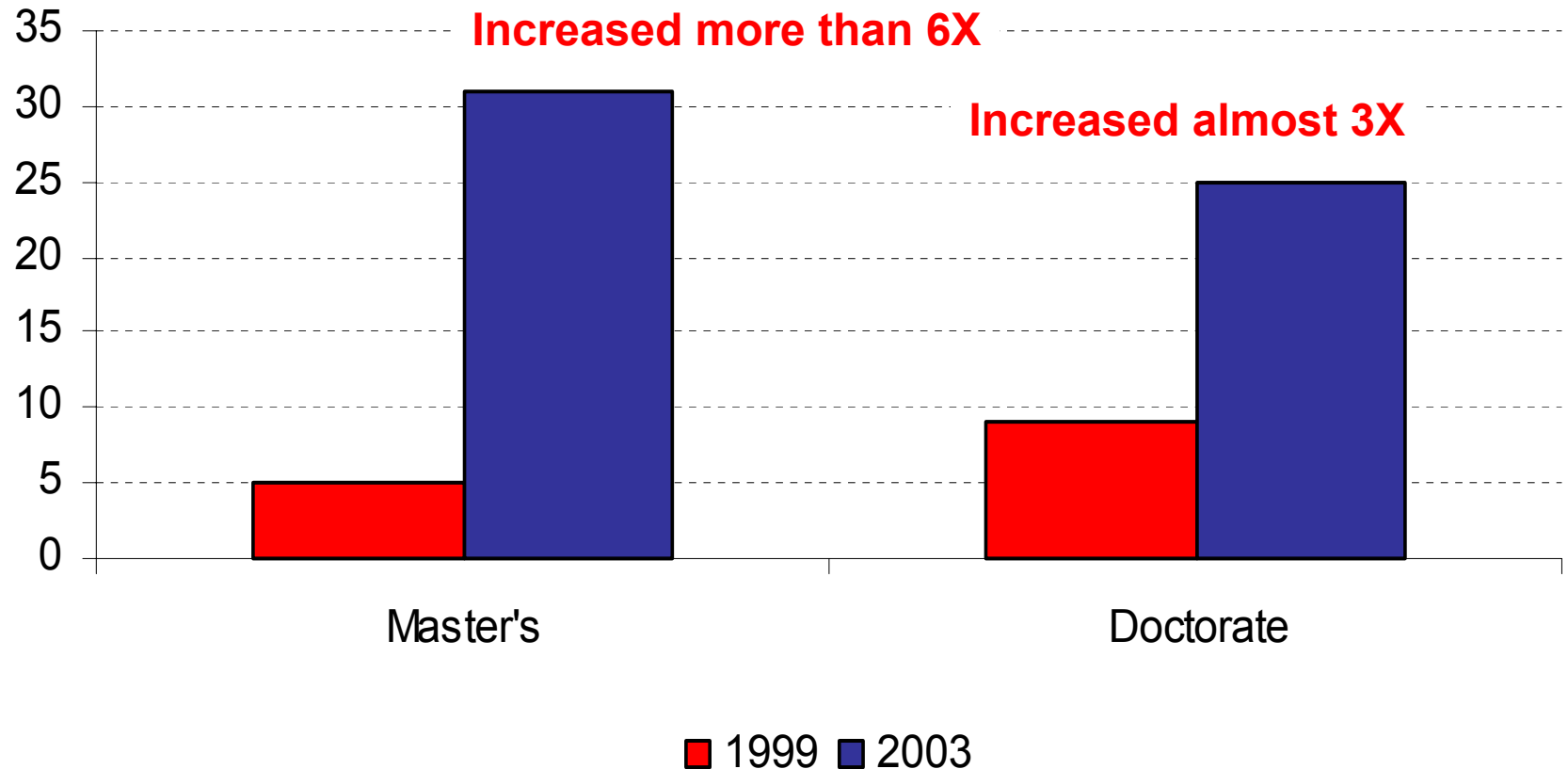


# Overview

- Supply Side: Survey of Academic Programs
- Demand Side: Job Ads in *Science*
- Observations from Conference for Bioinformatics Master's Programs
- Challenges Facing PSM programs

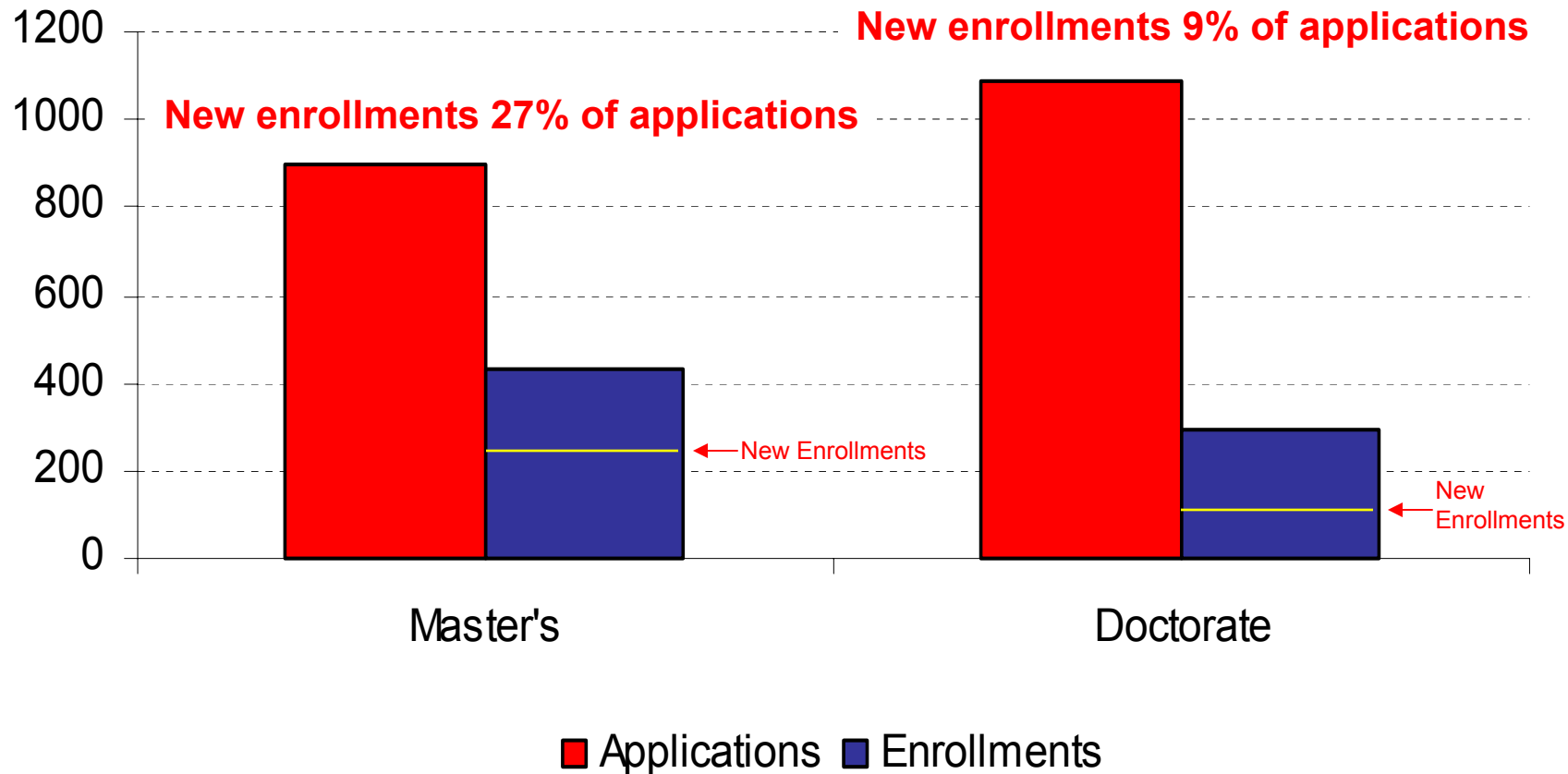


# Number of Training Programs



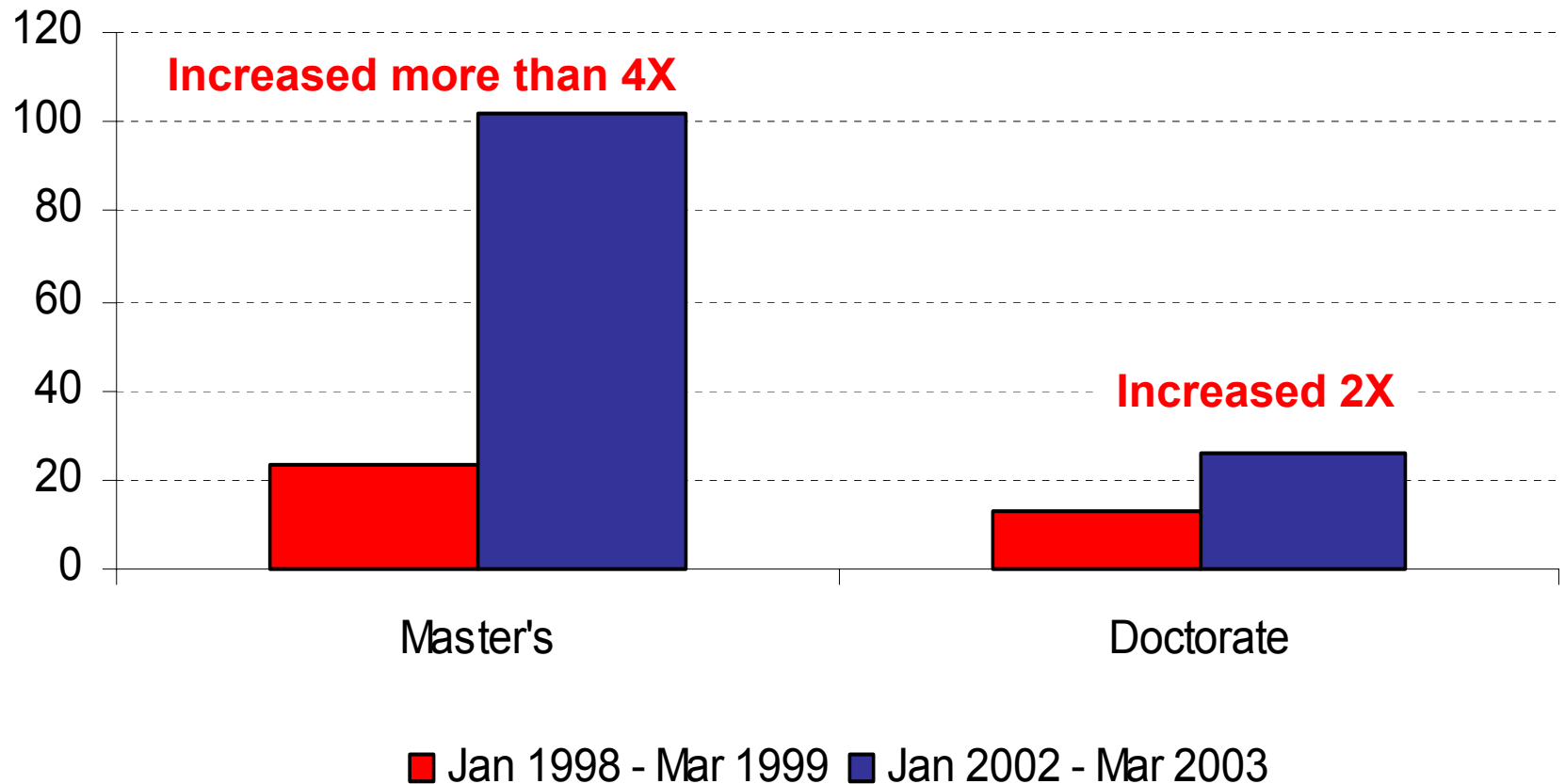


# Applications and Enrollments for Bioinformatics Programs, 2002-03





# Number of Bioinformatics Program Graduates, 1998-99 and 2002-03





# Average Starting Salaries, 2002-03

- Master's graduates:
  - Ranged from \$30,000-\$40,000 to \$125,000+
  - Graduates from 6 of the 12 reporting programs averaged more than \$125,000
  - Graduates from 3 of the 12 programs averaged \$60,000 or less
- Doctorate graduates:
  - Ranged from \$60,000-\$70,000 to \$80,000-\$90,000
  - Graduates from 3 of the 4 reporting programs averaged \$80,000-\$90,000



# Location of Jobs from University

Average Proportion of Students Hired, by Distance from University and Degree, 2002-03

	Masters	Doctorate
Locally	45.9%	29.0%
Regionally	22.9%	8.3%
Nationally	26.9%	62.7%
Internationally	4.2%	0.0%



# Summary of Supply Side

- More training programs offered for masters level than doctorate level, opposite from 1999
- Many programs are new and have yet to produce graduates
- Bigger enrollments in masters versus doctorate programs
- Broader distribution of average starting salaries for master's students than for doctorate students
- Master's students more likely to find a job closer to their university than doctorate students



# Number of Positions Advertised in *Science*, 1996-2002

Year	Number	% Change	
1996	209	--	
1997	354	69.4%	} Slowed Growth
2000	443	25.1%	
2001	372	-16.0%	} Increased Decline
2002	254	-31.7%	



## Distribution of Positions Advertised in *Science* by Sector of Hiring Institution, 2000-2002

YEAR	ALL	FIRM	UNIV	NON- PROFIT	GOVT	UNKNOWN
2000	443	21.0%	66.8%	5.6%	6.3%	0.2%
2001	372	14.0%	67.7%	12.4%	4.6%	1.3%
2002	254	10.6%	79.9%	3.9%	5.5%	0%



## Distribution of Positions Advertised in *Science* by Sector of Hiring Institution and Requested Degree, 2000-02

	ALL	FIRM	UNIV	NON- PROFIT	GOVT	UNKNOWN
MASTERS						
2000	46	39.1%	45.7%	10.9%	4.3%	0%
2001	21	28.6%	52.4%	0%	4.8%	14.3%
2002	6	33.3%	66.7%	0%	0%	0%
DOCTORATE						
2000	431	16.5%	71.9%	5.6%	5.6%	0.5%
2001	314	9.6%	82.2%	3.2%	4.8%	0.3%
2002	241	4.1%	85.9%	4.6%	5.4%	0%

Note: Number of positions by degree may not sum to the actual number of positions due to some ads listing multiple degrees for a given position.



# Summary of Demand Side

- Rapid overall growth in mid- to late-1990s
- Substantial drop since 2000
- Demand for doctorates far exceeds demand for masters
- Universities have dominated recent demand, followed by industry
  - Industry job more likely for master's than for doctorate



# Observations from February 2003 Bioinformatics Master's Program Conference

- Students don't have good understanding of industry environment and range of job opportunities
- Information on alumni placements and careers lacking
- Many programs struggle to establish industry ties and internships
- PhDs preferred over master's students:
  - Faculty and students believe industry would rather have PhDs
  - Industry may have limited view of master's students' skills – a “professional” degree may not send enough of a signal
  - Industry likes PhDs because of their longer experience in the field



# Challenges for PSM Programs

- Continued competition with PhDs:
  - High PhD production in life sciences and their “poorer” job prospects can make industry jobs more attractive for PhDs
  - Perceived benefits of PhDs to industry
- Perception of master’s degree and signal of skills
- Concern for long-run sustainability of programs