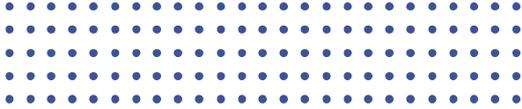




The Leaky CS Pipeline in Syntucky



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Table of contents

01

Introduction

Project Overview

02

Motivation

Why the Computer Science Pipeline Matters

03

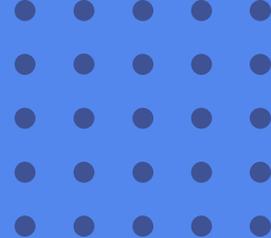
Analysis

Leaky Pipeline Exploration

04

Next Steps

Future Analyses, Limitations, Policy Implications





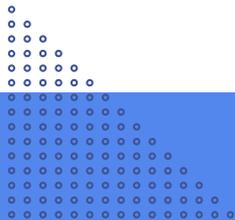
01

Introduction



Analysis Introduction

- Computer science is an increasingly **important sector** in our economy.
- High schools in Syntucky continue to promote computer science as a core skill, **yet disparities in the workforce remain**
- This study seeks to assess the **pipeline to the computer science sector** by analyzing the experiences of postsecondary students who ever pursue a degree in the field, who ultimately succeeds in completing, and how those groups differ





02



Motivation



What is Computer Science?

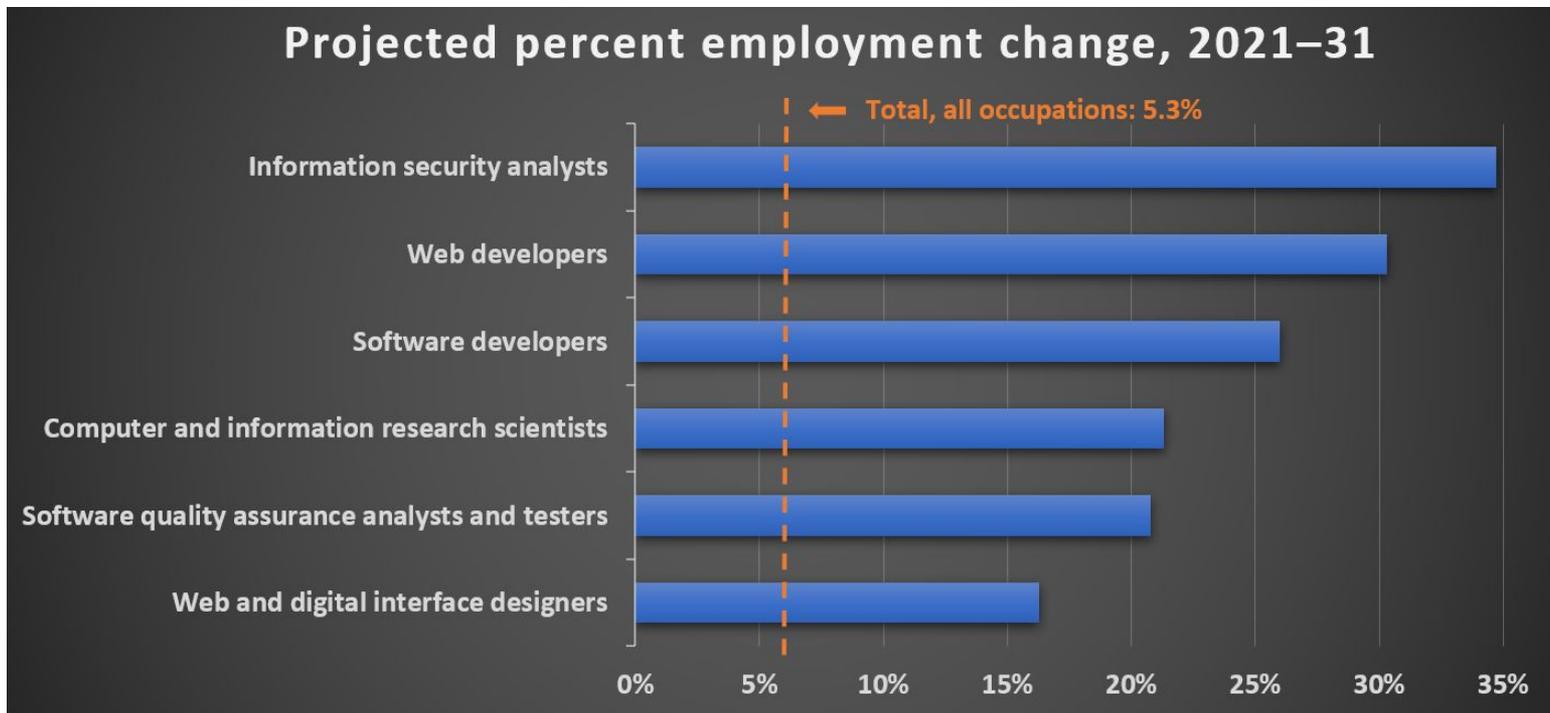
- Computer Science is the **study of computers and computational systems.**
- Includes occupations such as:
 - Computer and Information Systems Managers
 - Information Security Analysis
 - Database Administrators
 - Computer Programmers
 - Software Developers
 - Web Developers



Source:
Kentucky Council on Postsecondary Education.
<https://undergrad.cs.umd.edu/what-computer-science>

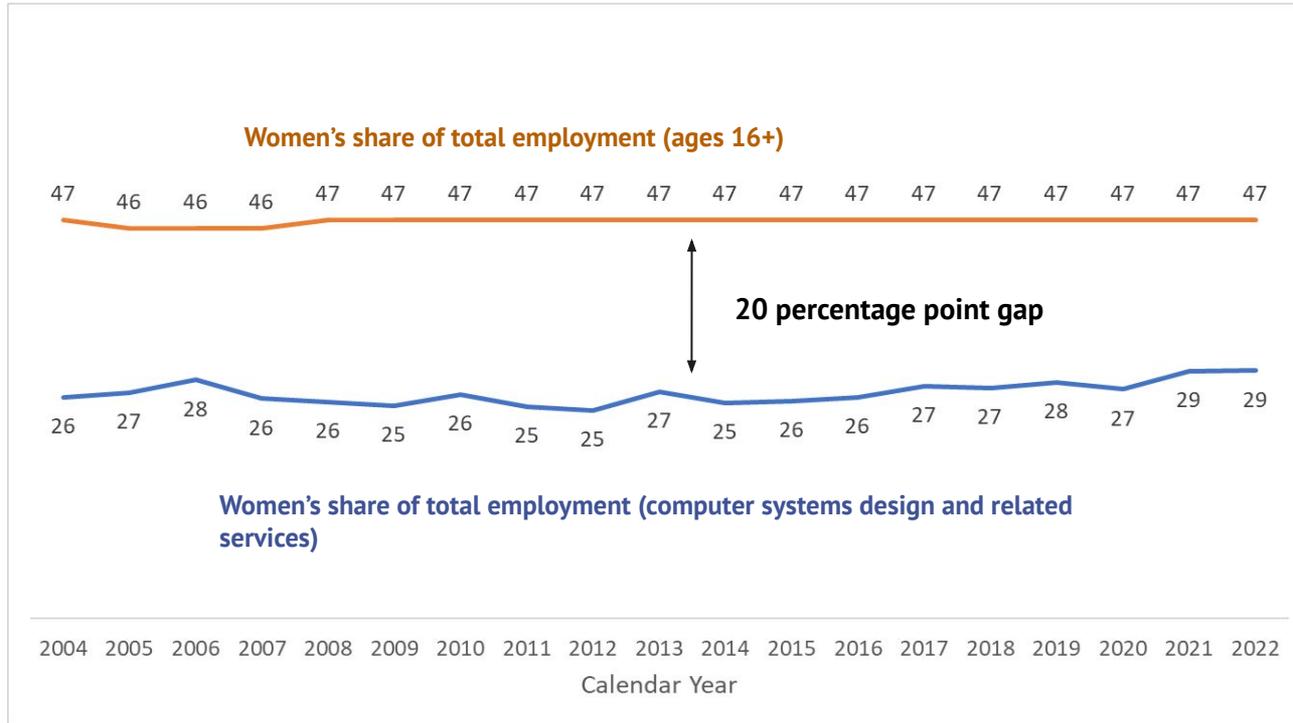


Economic Impacts



Source: “Computer Science Education Week: Explore In-Demand IT Jobs” US Department of Labor blog:
<https://blog.dol.gov/2022/12/01/computer-science-education-week-explore-in-demand-it-jobs>

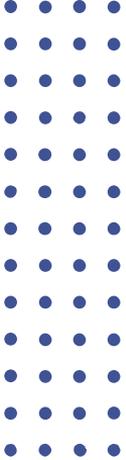
Female employment in CS lags behind share of total employment.



Source: Bureau of Labor Statistics Current Population Survey (2004 to 2022, table '18. Employed persons by detailed industry, sex, race, and Hispanic or Latino ethnicity'). Retrieved from <https://www.bls.gov/cps/tables.htm>

Pipeline Analytical Approach

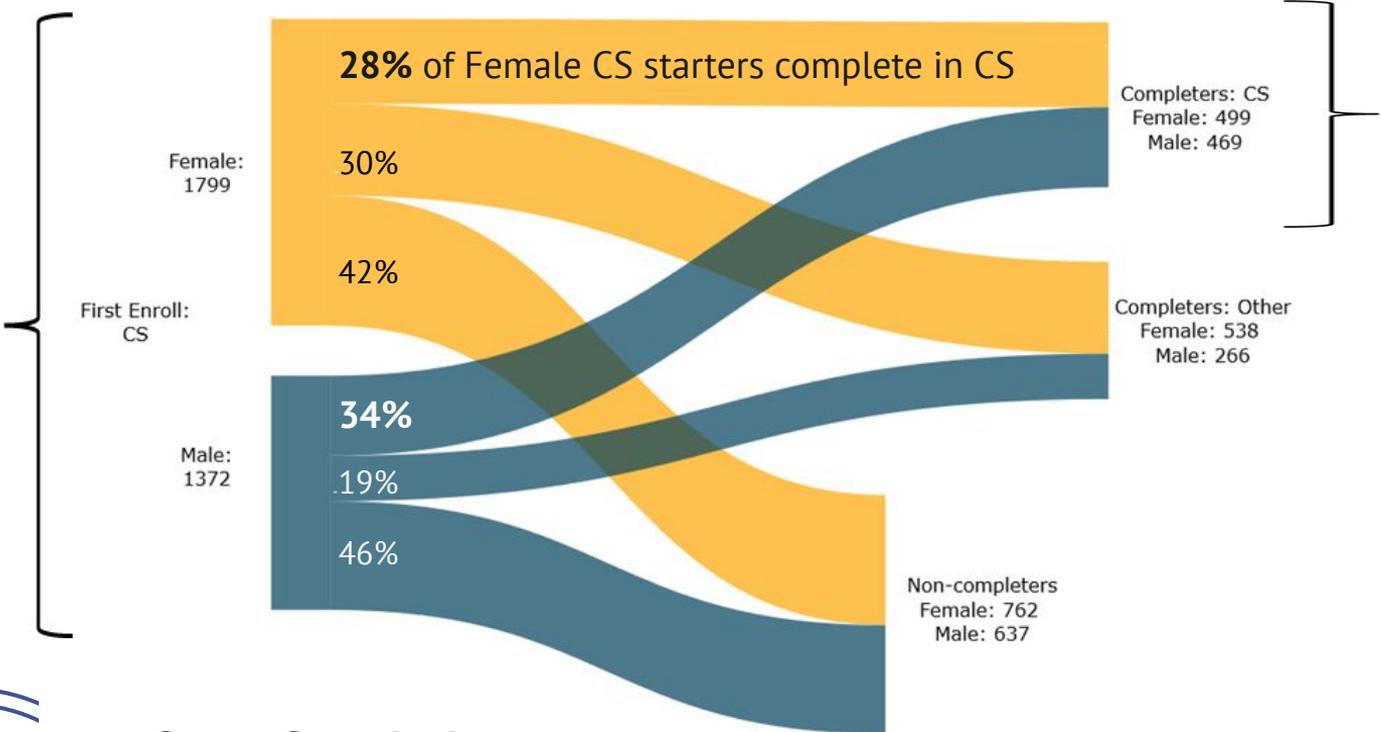
- Bachelor's Pursuers
- Started in 2013, 2014, or 2015 academic years
- Student self-reported gender (NA removed)
- Age Buckets (Kept ages 16 to 65 upon first pursuit)
- Any experience with Computer Science engagement
 - First enrollment, first completion, high completion
- Focus of the pipeline analysis: CS pursuers and CS completers by gender, URM, and Pell recipient



Women make up more than half of bachelor pursuers in CS but complete at a lower rate.



CS Starters:
57% Female

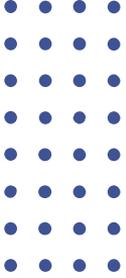


CS Completers:
52% Female

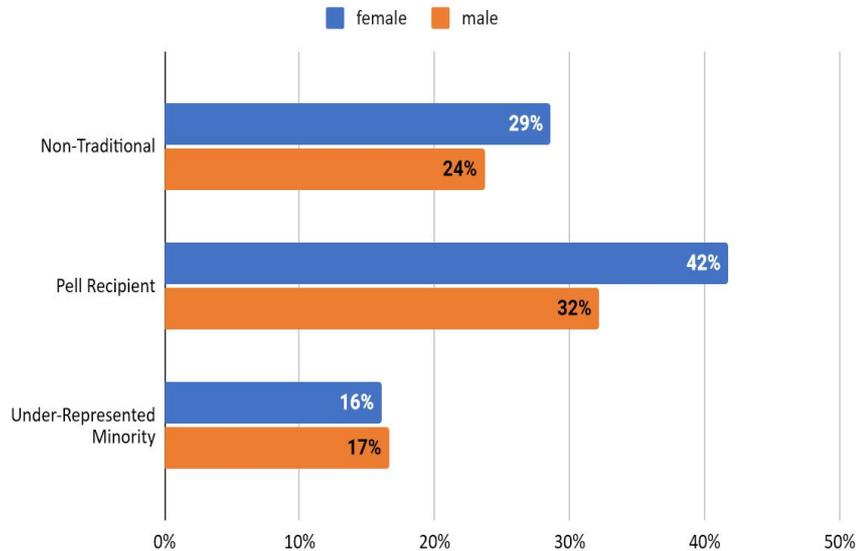
Source: Syntucky data



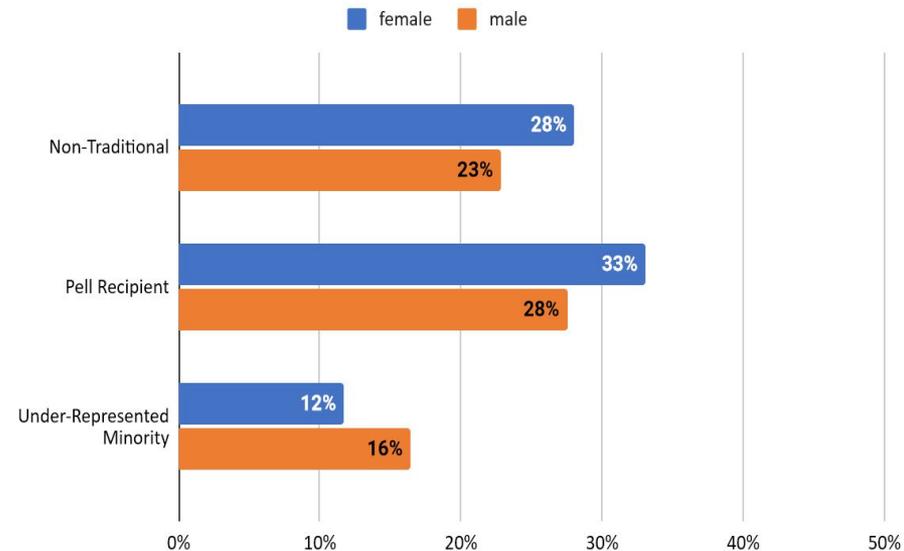
Females who are Pell Recipients or URM seem to leak out of the pipeline.



Starting Cohort



Ending Cohort

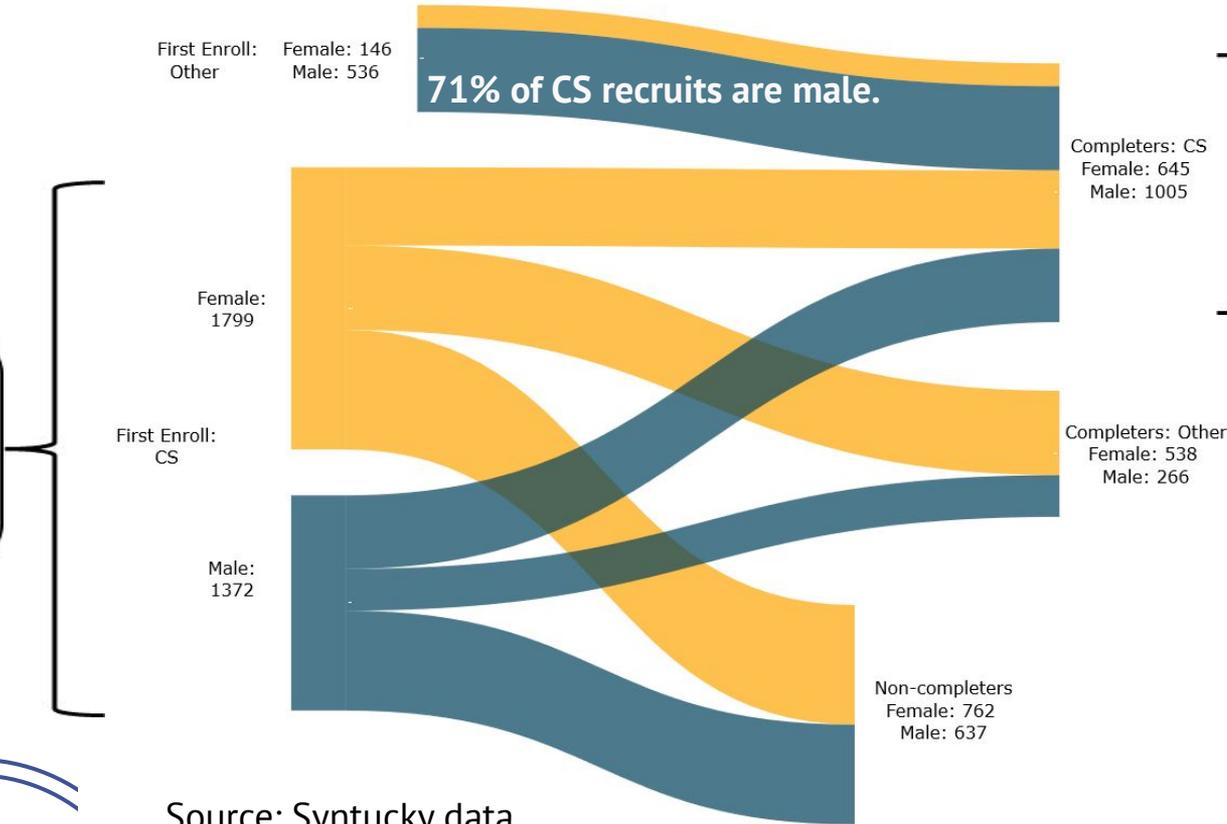


Source: Syntucky data

CS attracts more males from other majors.



CS Starters:
57% Female



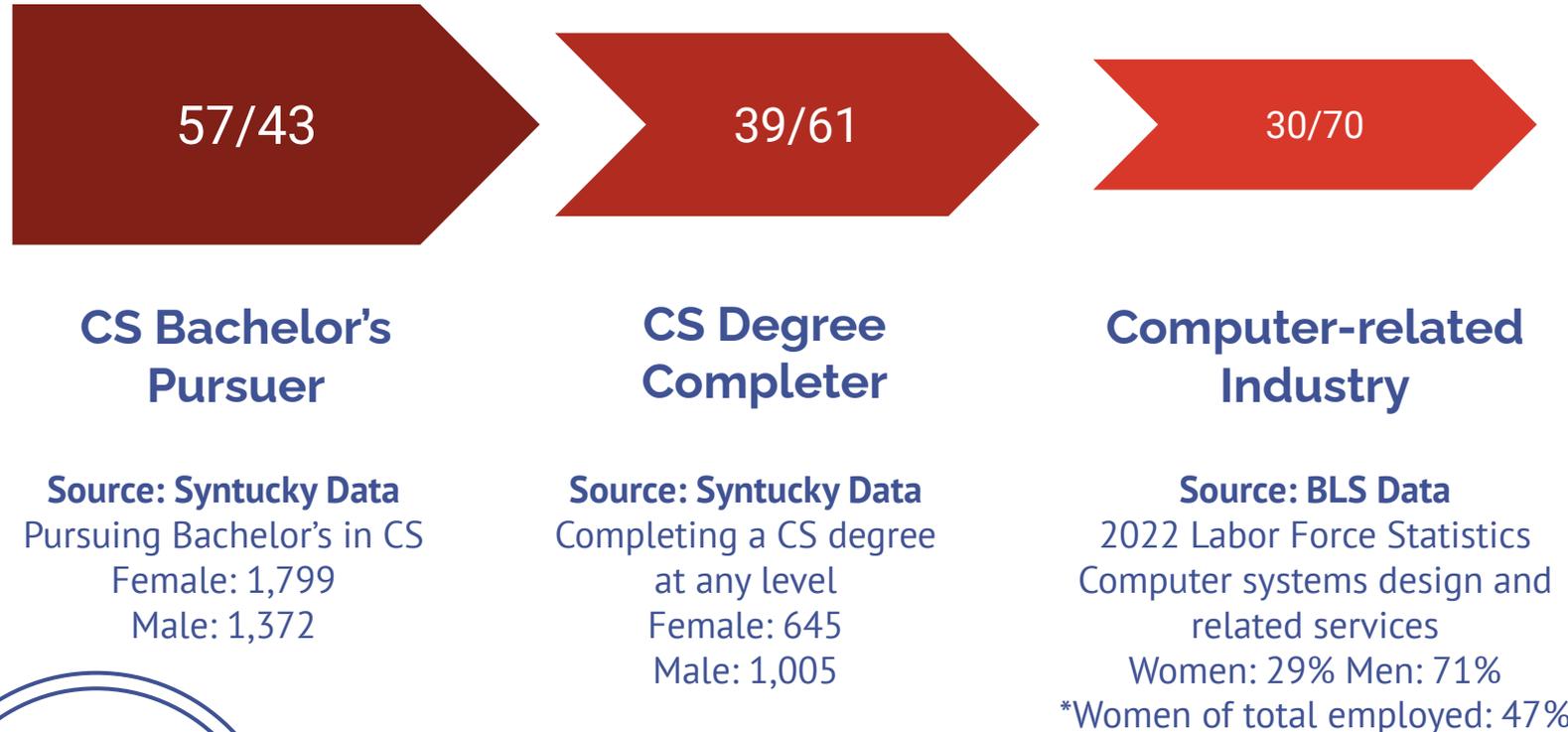
71% of CS recruits are male.

CS Completers:
39% Female

Source: Syntucky data

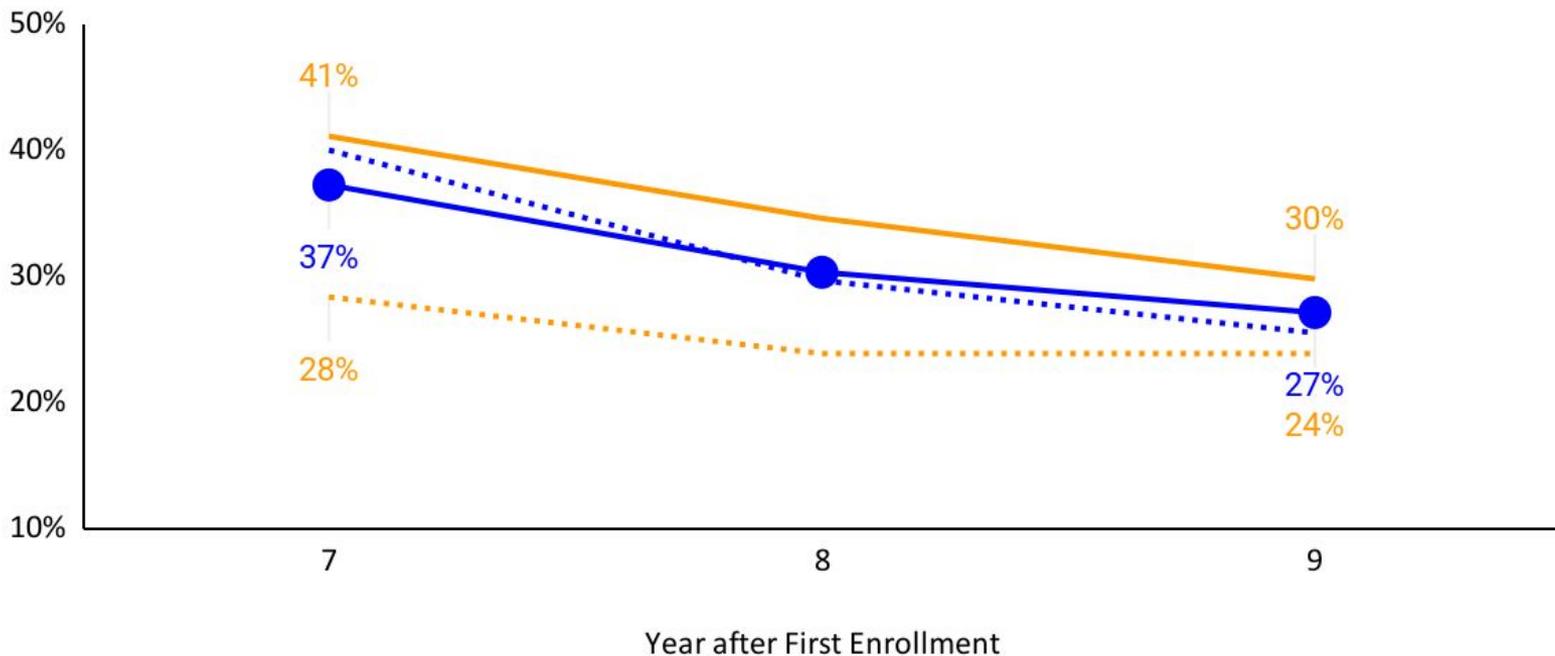


The leaky pipeline extends to the labor force.

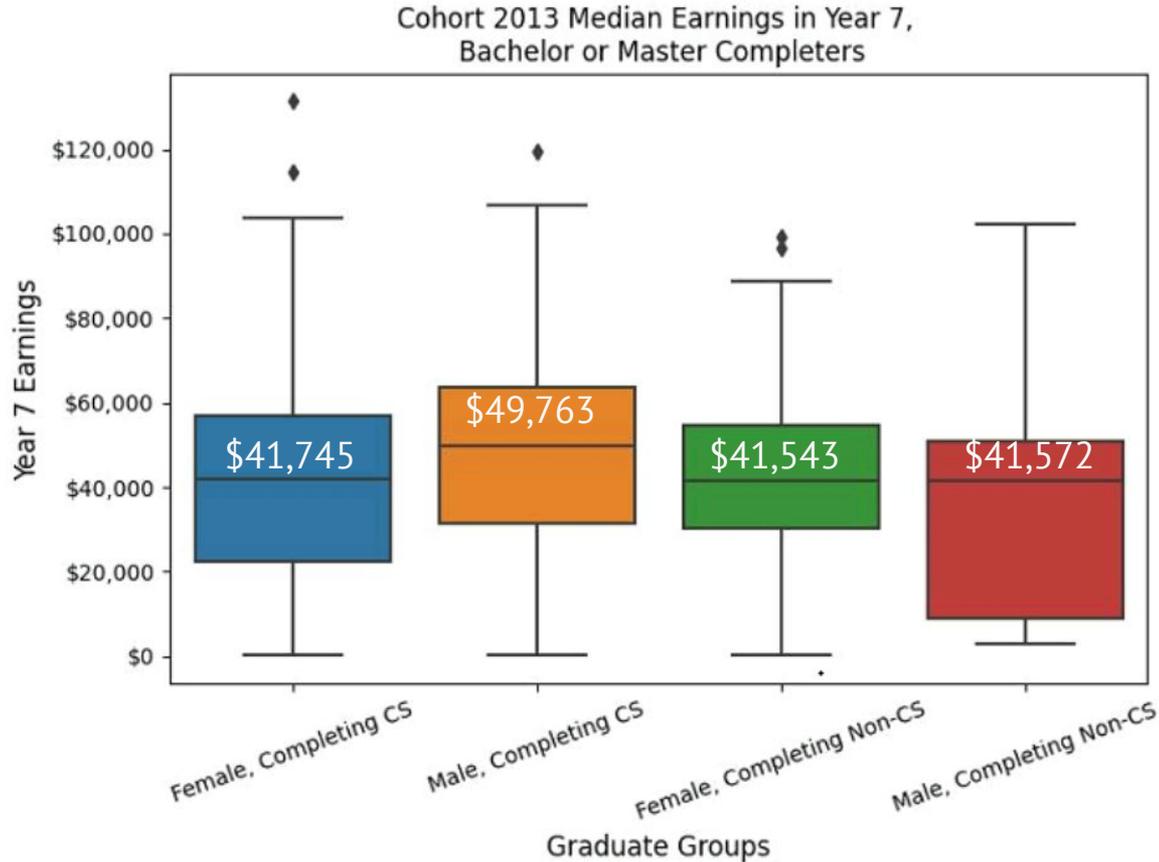


CS-interested female graduates have comparable employment rates regardless of major.

- Female, Completing Bachelor or Master in CS
- Female, Completing Bachelor or Master in Non-CS
- Male, Completing Bachelor or Master in CS
- Male, Completing Bachelor or Master in Non-CS



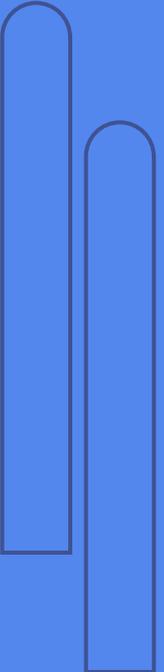
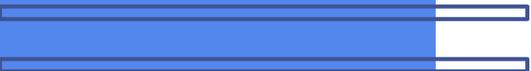
Female graduates do not benefit from the CS wage premium as much as male graduates.





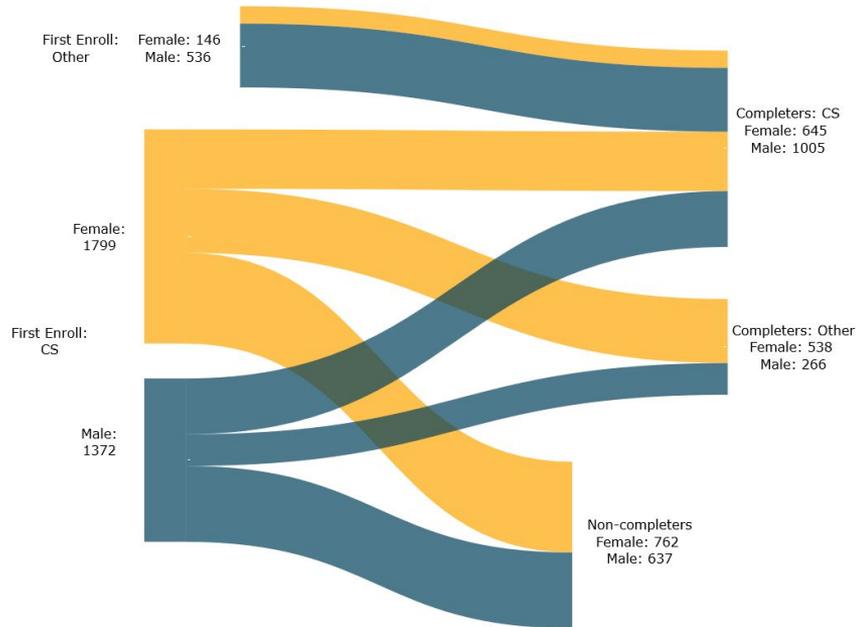
04

Next Steps





Next Steps



- **Pipeline:** Better parse out pipeline categories. Those who complete an Associate degree are different than non-completers and compare their experiences.
- **Missingness:** Is there a pattern in the missingness of employment outcomes?
- **Machine Learning:** Potential future research: build model to identify at-risk CS students who are likely to leave the pipeline and provide intervention (e.g., scholarship, retention program, employment assistance) based on prediction results to improve student outcomes.





Limitations

- Limited to short term employment outcomes
- Limited to employment and wage outcomes within Syntucky
- No industry or occupation of employment within this data
 - Cannot assess career pathways
 - Cannot assess long term retention in CS employment
- No information on:
 - Types of postsecondary institutions (e.g., 2-year versus 4-year colleges) in the data
 - Credential programs that may not be included in this reporting
 - Existing institution- or program-specific interventions for female or URM retention
 - Student aspirations / educational goals

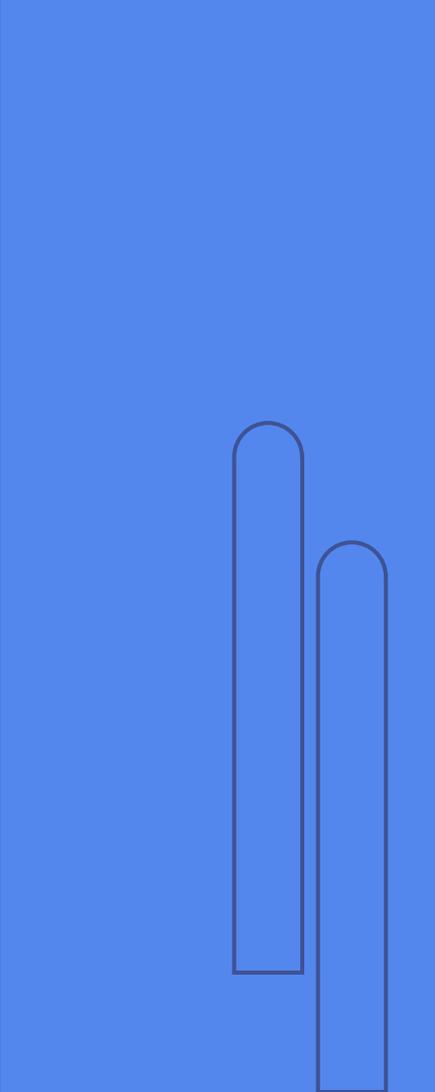




Policy Implications & Recommendations

- **Identify connections** to state workforce or postsecondary education goals, master plans, task forces, or existing resources.
- **Explore investments or targeted interventions** to reduce the equity gap (e.g., intrusive advising models, performance in gateway courses, participation in early postsecondary opportunities.)
- **Consider implications** for incentivizing change through performance- or outcomes-based funding models.
- **Foster partnerships** (e.g., assistantships, internships) between postsecondary institutions and its major employers in the field.
- **Reconnect with learners** who majored in the field but did not complete a credential.
- **Understand trends** in computer science graduates re: actual *human capital flight* (i.e., brain drain) and in “living locally while working globally.”





Thank You!