



THE CHALLENGE

OUR APPROACH

OUR PROCESS

OUR RESEARCH TEAM

BUDGET

# REWRITING THE CODE:



# RECRUITING, RETAINING AND ADVANCING WOMEN IN TECH: RESEARCH AND PROGRAMMATIC PROPOSAL

KIMBERLY JENKINS, PHD  
JANUARY 26, 2017



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# the Challenge

Here's what we know. Women are dropping out of university computer science programs at an alarming rate. Despite the 50/50 gender balance in introductory CS courses, less than 20% graduate with a major in CS. The quit rate of women early in their corporate technical careers is also unacceptably high – 41% quit in the first 10 years on the job.

We also know that gender diversity is fundamental to the development of market-viable technologies, a growing bottom-line issue for tech companies. More women in the design and development of new technologies would both address the huge number of unfilled technical jobs (over 500,000/year) and also meet the demands of an increasingly diverse marketplace.

But there's a lot that we don't know. We don't know why women quit tech. There are many unanswered questions – and many untold stories – about the obstacles women face. Until we fully understand the reasons in a deep and nuanced way, we cannot fully effect change toward a better future for women in technology, the companies that want their talent, and the US economy that needs their participation in tech innovation.



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OUR PROCESS

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BUDGET

# OUR APPROACH IS AN ACTION-ORIENTED, QUICK TURNAROUND RESEARCH PROGRAM






## Our Approach

We propose an action-oriented, quick turnaround research program to provide a data-driven, multi-lens view of this challenge. We'll deliver detailed, rich insights into the challenges women face and pinpoint opportunities to drive change both at the collegiate level and in the workforce.

But we'll do much more than that. This is not another round of research focused on "admiring the problem." The real value of this program lies in delivering actionable results. With insights attained through a blend of quantitative and qualitative research, we propose to test and iterate prototype solutions in real-life situations to monitor their effectiveness. We will combine the best research with best practices over time. The results of our research will be put into action and communicated widely so that others can benefit from this work.

There are three main components to our approach:

 Quantitative Longitudinal Studies	 Qualitative Longitudinal Studies	 Innovation Sprints
<p>Quantitative longitudinal studies to provide data over time pertaining to women in technology. We plan to conduct an annual survey over at least five years with cohorts that include two key groups: young women majoring in computer science at universities and women in their first ten years of technical careers in a diverse group of tech companies.</p>	<p>Qualitative longitudinal studies that dig deeper into survey findings to understand nuances and probe the critical "why." We will include in-depth interviews with a subset of women and use mobile diaries that will encourage women to document interactions, experiences and examples in the moment, on their phones.</p>	<p>Innovation sprints to implement findings and test possible solutions. This will include co-innovation projects with a subset of women, as well as prototype solutions that can be tried and tested in actual education and working environments (i.e., both academic and corporate).</p>

We will study two career phases. Immediate studies will look at our cohort of approximately 100 Rewriting the Code Fellows, all women early in their academic careers as Computer Science majors across the country. In the second phase of our work, we plan to launch a study of women in early stage careers (first 10 years) in technical roles in tech companies. We want to understand both the "tangibles" and "intangibles" that influence a woman's experience in the CS major and in technical roles in the workforce to determine why they stay or leave.





## Our Approach (cont.)

### SAMPLE QUESTIONS OUR RESEARCH WILL ANSWER:

1. **What traits** are predictive of success among women who complete the CS major (e.g., personality, background and training)?
2. **What points in time** are the highest risk for dropping out of technical work (in college or their early careers), and when might program interventions be most useful?
3. **What obstacles** do women encounter (such as feelings of isolation, imposter syndrome, implicit and explicit bias, and so on), how do these affect them, and what, if anything, are they already doing to work around these challenges?
4. **What interventions and educational programs** have an impact on their behavior, career choices, and career longevity?
5. **Which processes and programs in tech companies** help or hurt women’s ability to be successful (hiring, onboarding, mentoring, peer support, performance evaluations, work assignments, compensation, professional development, etc.)?
6. **Which aspects of the culture** (unique to each company) influence the retention of women in tech (positively or negatively)?

We will share research results quickly and widely. We plan to analyze data and summarize key findings regularly. Data will reveal insights and point us in valuable directions, but we’ve also seen firsthand the power of stories to drive real, substantive change. To that end, we intend to share our research in compelling, narrative-driven formats that inform, inspire and activate.



# OUR PROCESS: THE RESEARCH TEAM USES AGILE METHODS TO STRUCTURE WORK IN TWO-WEEK SPRINTS



## Our Process

Rewriting the Code recently completed a pilot program with 10 women majoring in Computer Science at Duke University. This year we scaled to 150 women majoring in CS from 26 different colleges and universities. We're working closely with experts in quantitative and qualitative research to understand why women drop out of CS in college. We'll apply this research to develop programs that meet the needs of women in CS.

The research team uses agile methods to structure work in two-week sprints. This allows us to flex, stay responsive as a project evolves, and provide findings that can be implemented in a timely way.

### A phased approach:

PHASE	DESCRIPTION
Longitudinal Study	We suggest a phased approach to this work, beginning with formative research to establish a baseline for a longitudinal study and inform a more detailed research plan. In this formative stage, we'll review current research to identify gaps and provide additional context. In addition to reviewing the data from women in the 2016 pilot cohort, we plan to interview women in our target cohorts of approximately 100-150 Rewriting the Code Fellows. We will also interview stakeholders, subject matter experts, corporate recruiters and hiring managers, and potential allies (such as men in tech leadership and male faculty members in CS programs).
Innovation Sprints and Implement Programs	Following the formative phase, we'll implement the longitudinal study, begin innovation sprints, and implement programs based on our findings. The second phase of our research will extend into the early careers of women in the tech workforce (first 10 years). Again, we plan to understand why so many women leave tech at this point in their careers: the obstacles they confront and what tech companies can do to help retain this valuable talent.
Annual Report Annual Summit Share Best Practices	We'll share widely an annual report on key findings, recommended actions, and prototype case studies. We also propose an annual summit to bring leading CS educators from universities and executives from major tech companies. We intend to promote collaboration and to share findings and best practices among universities, tech companies, leading researchers in the field, and the media.





THE CHALLENGE

OUR APPROACH

OUR PROCESS

OUR RESEARCH TEAM

BUDGET

OUR RESEARCH TEAM:  
WE HAVE CREATED  
A SMALL, DIVERSE,  
TALENTED TEAM  
OF RESEARCHERS,  
EDUCATORS, AND  
PROGRAMMATIC  
EXPERTS





## Our Research Team

We have created a small, diverse, talented team of researchers, educators, and programmatic experts. Our team includes quantitative and qualitative researchers from Workshop, Duke University, and Rewriting the Code. We will add a research expert in gender diversity to our team (pursuing recommendations of the Clayman Institute). A research advisory board drawn from leading universities and tech companies will inform and improve all aspects of our research program.

### The Workshop (led by Anna Adlard and Ben Adlard):

**Anna** is a veteran of market research and communications strategy. As Director of Insights for Capstrat, Anna led market research and strategy for prominent clients in higher education, healthcare, and financial services. Now she's pushing the envelope on market research through a combination of agile methods and design-thinking. She will assume the lead in managing the Rewriting the Code research team.

**Ben** is a seasoned tech product manager working with start-ups, an award-winning digital agency, and most recently, a global foundation based in South Africa. At Workshop he oversees rapid prototyping on innovations that span both technical solutions and business transformation. Workshop's recent assignments include major initiatives with Cradle to Cradle and Google (a joint research endeavor), an eLearning platform for healthcare workers, and an open-source mobile messaging platform in developing world organizations funded by the Bill and Melinda Gates Foundation, Nike Girl Foundation and UNICEF.



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the  
**Workshop**

## Our Research Team (cont.)

### Kevin Weinfurt, PhD

**Kevin** is Professor of Psychiatry and faculty at the Duke Clinical Research Institute. Trained as an experimental psychologist, Kevin has conducted both quantitative and qualitative research on a variety of topics, developed measures for use in research, and is currently working on ways to improve the collection of real-world evidence and pragmatic research.

### Carl Pieper, DrPH

**Carl** is an Associate Professor in the Department of Biostatistics and Bioinformatics with the Duke Clinical Research Institute. His areas of expertise include longitudinal data analysis, psychometrics (questionnaire design), the design and analysis of research programs, and the design, conduct, and analysis of implementation trials.

### Kimberly Jenkins, PhD

**Kimberly** is Founder and President of Rewriting the Code and adjunct faculty at the Duke University School of Engineering in Electrical and Computer Engineering. Her career as a woman in tech spans 30 years in tech companies and universities. At Microsoft she founded the education division. At NeXT she worked with Steve Jobs on third-party software development. At Duke University she founded and ran the campus-wide Innovation and Entrepreneurship Initiative. In 2016, she launched a pilot program for women in CS at Duke and founded Rewriting the Code.

### Research Expert

**Research expert** on the topic of women in tech to be added to the team (referrals from the Clayman Institute are being approached at this time).





THE CHALLENGE

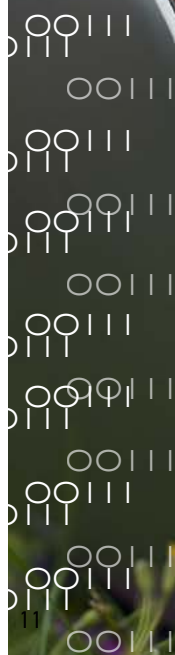
OUR APPROACH

OUR PROCESS

OUR RESEARCH TEAM

BUDGET

# PRELIMINARY BUDGET ESTIMATES: FOR RESEARCH DESIGN AND IMPLEMENTATION



# the Budget



## PRELIMINARY BUDGET ESTIMATES FOR RESEARCH DESIGN AND IMPLEMENTATION

The budget provided below is our best estimate based on assumptions about the program design. The scale and scope of our work (including cohort size, the ways we communicate findings, etc.) will influence the final budget. We look forward to an open conversation and feedback about the design and budget for this research program.

### YEAR ONE:

#### DEVELOPMENT OF RESEARCH APPROACH AND TOOLS; CONDUCT BASELINE RESEARCH

- Secure the final research team
- Prepare and facilitate kickoff workshop for the entire research team
- Conduct in-depth interviews with stakeholders, subject matter experts, allies, and a sampling of university women in computer science
- Review and summarize existing research; identify key concepts and current best practices
- Develop quantitative and qualitative study design
- Agree on the final research tools that have been developed
- Identify and recruit a control cohort of university computer science-interested women that matches the Rewriting the Code Fellows (if budget and time permit)
- Conduct in-depth baseline interviews with program cohort (all RTC Fellows, and control cohort if implemented)
- Analyze data
- Prepare baseline research report
- Conduct project management and core team meetings

TIMING/EST. BUDGET

January – April 2017 / \$300,000





## PRELIMINARY BUDGET ESTIMATES FOR RESEARCH DESIGN AND IMPLEMENTATION (cont.)

### YEAR ONE (cont.):

CONTINUING RESEARCH IMPLEMENTATION, PROGRAM INTERVENTIONS, AND DATA COLLECTION:	
<ul style="list-style-type: none"> <li>• Develop, manage and conduct quantitative and qualitative research surveys for RTC Fellows</li> <li>• Create and prototype educational programs for RTC Fellows in Silicon Valley, Raleigh/Durham, and Washington, DC based on evidence from the surveys</li> <li>• Develop, manage and evaluate mobile diaries for RTC Fellows</li> <li>• Plan and conduct periodic interviews with RTC Fellows</li> <li>• Conduct in-depth interviews with program cohort of RTC Fellows in November and December</li> <li>• Analyze data</li> <li>• Provide quarterly reporting on research findings</li> <li>• Develop and communicate annual impact report</li> <li>• Recommend prototypes to test in innovation sprints for educational programming provided to 2018 cohorts</li> </ul>	
TIMING/EST. BUDGET	May – December 2017 / \$500,000



**PRELIMINARY BUDGET ESTIMATES FOR RESEARCH DESIGN AND IMPLEMENTATION (cont.)**

**YEAR TWO:**

CONTINUING RESEARCH IMPLEMENTATION, PROGRAM INTERVENTIONS, AND DATA COLLECTION:	
<ul style="list-style-type: none"> <li>Continue a second year of analogous research with the second program cohort of RTC Fellows (and a new, matched control group if possible). Continue to survey and analyze findings from the groups from the previous year.</li> <li>Define specific goals, design studies and develop tools to conduct research on women in technical roles in companies to understand their experiences and determine why they stay or quit in their early years. This is the beginning of a multi-year study. Survey data on their experiences in this study year will be used to develop interventions and programs for companies to adopt to stem the female quit rate.</li> <li>Continue frequent reporting, workshops, prototypes, rigorous evaluations, and improved implementation.</li> </ul>	
TIMING/EST. BUDGET	January 2018 - December 2018 / \$750,000

**YEAR THREE TO YEAR FIVE:**

CONTINUING RESEARCH IMPLEMENTATION, PROGRAM INTERVENTIONS, AND DATA COLLECTION:	
<ul style="list-style-type: none"> <li>Further expansion of research as program grows in scale (to be determined) and Fellows are followed into their future careers.</li> <li>It is anticipated that programs will be developed in collaboration with tech companies on cultural programming that addresses the research findings.</li> </ul>	
TIMING/EST. BUDGET	Annually \$750,000+ (depending on size of cohorts as determined by plans to scale)

**ADDITIONAL ANNUAL BUDGET ELEMENTS:**

CONTINUING RESEARCH IMPLEMENTATION, PROGRAM INTERVENTIONS, AND DATA COLLECTION:	
<ul style="list-style-type: none"> <li>Travel for research team to conduct research (at different universities and tech companies), attend conferences and participate in annual summit (\$50,000 first year; \$75,000 second year; \$75,000 third year)</li> <li>Materials, supplies (\$5,000/year)</li> <li>Annual report video, design and print (\$75,000/year)</li> </ul>	





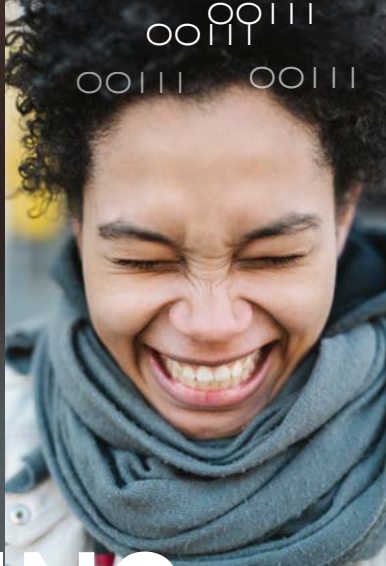
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# REWRITING THE CODE:

Rewriting the Code programs and partnerships open doors for undergraduate women in computer science, instilling confidence, retaining women in technology, and advancing the next generation of talent. Your support gives you an opportunity to **revolutionize the world of tech.**

Kimberly Jenkins: [kjenkins@rewritingthecode.org](mailto:kjenkins@rewritingthecode.org) 919-360-4502

Sue Harnett: [sharnett@rewritingthecode.org](mailto:sharnett@rewritingthecode.org) 919-818-2536

