I am a PhD candidate in economics at Duke University specializing in development economics and economics of education. My research focuses on the determinants of human capital investment in developing countries. Specifically, I am interested in understanding what individual and household level characteristics (beliefs, behaviors, initial endowments) affect health and education related decisions, and whether knowledge of such information can be leveraged in programs or policy to improve welfare. Aside from research assistant work on projects in Sierra Leone and Tanzania, my research has focused primarily on evaluating health and education programs in Bangladesh where I've run three randomized-controlled trials (RCTs). I summarize my work on these experiments and outline my next steps below.

**Education:**

In my job market paper, Believing is Achieving: Targeting Beliefs about Intelligence to Increase Learning in Bangladeshi Secondary Schools, I present results from an RCT of an intervention that attempts to increase the perceived returns to effort in school. The growth mindset intervention, designed by psychologists at Stanford, teaches students that the brain becomes more powerful as we challenge ourselves, implying that effort today can increase our ability to learn in the future. I find the intervention changes beliefs about the nature of intellectual ability and increases effort and learning, especially for girls and those not already in the highest effort quintile. In addition, I isolate the specific information in the intervention responsible for this change. Previous literature on growth mindset claims that the intervention works via changing students’ beliefs about the malleability of intelligence, however growth mindset interventions provide additional messaging on the value of effort that could be driving the results. I test the impact of the plasticity messaging by including a second treatment group that is identical to growth mindset but makes no comment on whether the brain can change. My findings corroborate the theory in the literature: the group with messaging on plasticity does significantly better than that without, and strikingly the group without does no better than the control.

Previous work in economics has shown that effort impacts learning, and that incentives impact effort, but it is less clear how effort is chosen conditional on a set of incentives and whether an understanding of this choice would be useful for policymaking. My job market paper shows that beliefs about the learning production function are an important determinant of student effort and that they are subject to manipulation. Importantly, such manipulation maybe more cost effective than the use of traditional incentives. The findings also remind us that looking to psychology to improve our understanding of human behavior can be a fruitful exercise for economists.

**Health:**

In two previous RCTs with co-authors David Levine and Raymond Guiteras, I examine interventions to increase rates of safe water usage and handwashing with soap among the poor in Dhaka. In Disgust, Shame and
Soapy Water, we evaluate an improved behavioral messaging campaign and provision of low-cost devices for water treatment and hand-washing. Our behavioral messaging appealed to negative emotions, “disgust” and “shame”, associated with unsafe behaviors as prior literature had suggested was effective. The devices tested were a shared chlorine dispenser to treat water, which had been effective during pilots in east Africa, and a shared soapy water bottle for hand washing, a device our implementing partner had just begun testing. We found no lasting difference between the improved messaging and the standard messaging that had been used before. Use of the chlorine dispenser was extremely low in both groups (~8%), qualitative work suggested this was due to subjects’ strong distaste for the smell of chlorine. The soapy water bottle had modest but significant impacts on rates of handwashing. These results underscore the importance of understanding preferences when designing products to improve health outcomes; they need not only be effective and convenient, but attractive, or at least not undesirable.

In Credit Constraints, Present Bias and Investment in Health—as a response to our findings in the previous study—a more preferred point-of-use (POU) water treatment device (a two-stage water filter) was marketed to households. Anecdotal evidence suggested take-up of these filters on the open market was low due to their high cost, so a number of different time-payment plans were offered to investigate whether liquidity constraints were responsible. Using a modified Becker-Degroot-Marschak mechanism we measured willingness to pay (WTP) for the filter of each household for each payment plan. We found time payments nearly doubled WTP from 9 USD under a lump-sum, up-front payment, to 17 USD with a 6-month loan and 20 USD with a 12-month loan. These figures are very large in comparison with WTP measured for chlorine dispensers in the previous study which was no greater than 0.14 USD per household per month. This confirming our previous finding that tastes for products are extremely important. In ongoing structural work we hope to uncover the relative importance of credit constraints, time-preferences and risk in producing these large effects.

In both of the previous RCTs, randomization was done sequentially (as units were enrolled) as a time and cost saving measure. Papers in economics discuss optimal randomization methods under the usual condition, when it is done after a full baseline survey, but to our knowledge no work had gone over the optimal methods in the sequential case. We used the Da-optimal method of Atkinson (1982) and published a paper, The pursuit of balance in sequential randomized trials, that uses simulations to show the advantages of this method over others in common use.

Future work:

The next step in my research will be to expand upon my job market paper with a larger scale field experiment. My job market work was funded with a $50k pilot study grant from the Jameel Abdul Latif Poverty Action Lab’s (JPAL) Post-Primary Education (PPE) Initiative at MIT. The intention behind the pilot program is to find which programs have promise to be scaled up and evaluated on a larger scale. Given the positive results in my job market paper, I believe I have a good chance at receiving a full project grant of up to $300k from the PPE initiative. With this funding I would not only be able to test the intervention on a larger, more representative sample and answer unresolved questions from my JMP, I could investigate new questions not yet examined, such as: can growth mindset be used on the supply side to increase teacher quality or more drastically, to improve pedagogy? Proponents of growth mindset in the United States believe the intervention has implications for essential tenants of teaching, such as how to give effective praise (praise effort, not outcomes). If praise acts like monetary incentives then this theory agrees with findings from economics that show rewarding inputs is more efficient than rewarding outcomes. An intervention that trains teachers on growth mindset and affects behaviors, such as the form of praise given could have larger impacts than a one-off intervention on students and could be drastically more cost effective than an already highly cost effective
program. Additional funding would also allow for more precise measures of student effort and for comparison of treatment to one or more other treatments, such as information about monetary returns to schooling, or actual monetary incentives.

In the long run I hope to continue contributing to our understanding of how to increase human capital around the globe with more work in education and health and other fields such as criminal justice and prison reform. I also hope to continue testing and incorporating insights from psychology that have not received sufficient attention in economics and policy worlds. One such project in the making is an evaluation of meditation programs in prisons on recidivism. Work in psychology shows that meditation can affect self-control and impulsivity. These traits are also predictors of criminal behavior, thus meditation programs may be a cost effective way to reduce recidivism. Furthermore an analysis of the impacts of meditation on behavior has yet to be done from an economics perspective and may provide additional unforeseen insights. In this project and my others, my goal is always to produce high quality work that reveals insights about human behavior that are useful for improving human wellbeing.