

## ACKNOWLEDGMENTS

Even now that I'm writing the acknowledgements of this thesis, it doesn't seem to quite feel real just yet. In any case, I want to take the time to reflect back on my not-quite-so-straight path that eventually led to this cohesive set of writings on the research I've done with David Miller and the UChicago ATLAS group over the past 5 years. I still recall when I sat in David's office in the old HEP building wondering if he would be crazy enough to let me work for him. I started with the hardware project, using what I've learned from Rai Weiss and Sam Waldman at LIGO. Funnily enough, this is the second "David Miller" I've had the pleasure to work with, the first at Caltech when I was an undergrad working on the submillimeter wave observatory. Altogether, it's been a lot of fun, and hopefully we'll still be able to keep working together even after I leave UChicago for a post-doc.

I have many other people to thank, but most notably my parents: Suzane and Henry Stark, mom and dad. I'm grateful for all of the love and support, especially through the many battles over the years just to make sure I had the same level of access as anyone else, so that I could (and did) succeed. Even though you probably don't understand most of this thesis, you guys have always been there, thank you. The rest of my family has also been incredibly supportive and never stopped believing in me: my brothers Michael, Aron, Harrison; my sister Rachael; my uncles Morty, Philip, Brian; and my (fake) sister Kathy Buckley. They've all been helpful when I needed a break from my studies from time to time and head down to Florida, or over to Long Island.

I would like to also thank my committee members for bearing with me over this past year – Mel Shochet, Dave Schmitz, LianTao Wang, Heinrich Jaeger. They've had a lot of fantastic questions and comments that helped me learn how to explain and frame my research in the context of the bigger picture and has been much appreciated. As well, all my professors and teachers over the years who have, in some way or form, guided me along this path of Physics including Scotty Howard, Marilyn Pedek, Brian Murray, Mary Murray (no, they're not related), Beth Bobay, Jeannie Cornwell, and William Mech. Additionally, Harvey Newman is an excellent advisor and I was lucky

to have him for the four years I was an undergrad at Caltech. Even though I never did anything remotely related to high energy physics as an undergrad, it was probably not a surprise that I ended up running into Harvey again in Switzerland as a grad student.

The UChicago ATLAS HEP group has been an awesome place to work with a ton of brilliant people. I've enjoyed working closely with my fellow grad students Joakim, Miles, Kevin, Jeff, Karol, Patrick, Lesya, Todd; and I've learned a lot from the post-docs Max, Reina, Gabriel, Jamie, John. Max, Reina, Joakim, and Miles and I were David's group of misfits doing all kinds of amazing research and it seems to be interesting timing that (apart from Miles who graduated last year), all of us are moving on around the same time. I guess things just kind of work out like that in life. Joakim, thanks for all the late-night chats when I was in the midst of writing a thesis and for just being there. Max, how the hell did you stand me? It's been a lot of fun and we've definitely leaned on each other a lot for things and you're definitely one of the best post-docs I've known. Reina, we've had quite a few adventures together, including climbing all over Chamonix in France and I'm glad we got the chance to work together on gFEX. Lesya, thanks for being a fantastic friend and going to all of those Broadway shows with me and being here, except for when you moved to Switzerland and now you're "over there". I also want to thank the folks of the electronics design group here: Mary Heintz (manager) and Fukun Tang (engineer); never saying "no" to any of my crazy ideas and whose support helped make the hardware project a reality.

There are a lot of people to thank still, especially because I've found a home in the Chicago community here. Most especially, thanks to Simone, Anni, and Lilly. Simone, I don't know if you've ever watched Grey's Anatomy (I have) but I like to think of us as Meredith and Cristina on that show. We've had a ridiculous amount of fun, especially all of those random late-nights when we find ourselves in the middle of the city, hungry, and can't find a place to eat that's open so late. It would be funnier had it not happen dozens of times, we really need to find more late-night places. Anni, I've always tried to support you as much as you've supported me and I still feel like it's never enough. It's funny that we're both graduating at the same time and I'm proud of you and you deserve every opportunity you're going to get because of all the work and passion you put in as

an interpreter. And to Lilly (really, Eliza), it's funny that we both messed up each others' names the first time we met in that Starbucks in Old Town. You've been there when I was struggling from time to time over the past 4 years we've known each other and you've taught me a lot about seeing the world differently. I won't ever forget that. And to the rest of the Chicago Deafies: Evelyn, Sandy, JEF, Nick, Jason, Melissa, Jesse, Yehonatan, Cicely, Matthew, Crom, Peter, and many, many others; as well as the friends I've made along the way: McKenna, Helena, Caitlin, Umi, Boo, Alithea, Leah, and easily a hundred other people that is just too many to name in an already-too-long thesis. And finally, I would like to especially acknowledge those who have helped provide me with access to my research, Rivka Hozinsky and the many interpreters I've used along the way both here in America as well as around the world. Thank you for handling all of my requests over the years, no matter how short-notice or crazy they might have been. And finally, those who I've met as a result of working at CERN, the highly international collaboration of scientists including many Matts, Davids, and Bens, as well as: Michael Begel, Revital Kopeliansky, Trisha, Chiara, Ian, Elliot, Brianna, Tuna, Lukas, Jon, Attila, Nils, Chris, Peter, Micha (who I roomed with and bonded over our shared injuries due to the evil mandoline slicer), and the many other colleagues from across the ring. The thousands of people that make up CERN form a wonderful group to discuss techniques and foster ideas in the hundreds of meetings and conferences and workshops and plenaries and "weeks".

I've experienced a crazy, eventful 5 years all over the world and it still hasn't quite hit me yet how amazing this scientific collaboration is. I still can't believe David was crazy enough to take me on as a graduate student. To all I've named and those I haven't, this work is dedicated to you. Merci beaucoup á tous.