Technical Leadership :

Large Microchip Manufacturer

My role was to be the technical face and voice to a multinational client. They had two problems to solve related to asset fault mitigation. I designed and executed a production level solution for one and acted as a technical mentor to a newer data science team member for the other. The mentorship also extended to a younger data scientist on the client side, who now maintains our work. Both projects were successful and deployed to run on 100's of assets which led to two engagement extensions that brought over a million in profit to the team.

technical solutions included:

unsupervised random encoder forest to look for anomalous behavior in robot arm motions and traditional Fourier transform/wavelet decomposition to analyze vibration data in various pumps

Nuclear Power Generation Company

My role was as the technical lead for devising an approach towards proactive maintenance optimization for a large US based nuclear power producer. I had one other GE data scientist who supported me. Specifically I devised a way to rank maintenance opportunities based on existing metrics from the client as well as some based on traditional asset remaining useful life estimation. Additionally, the analytic has a feedback mechanism which (in principal) allows the ranked recommendations to improve over time. This is possible with a technician in the loop who can accept or deny the suggested maintenance opportunity. Based on the learning from this work, I collaborated as an advisor to members of our GE research team who then wrote an ARPA-E grant which was successfully funded.

technical solutions included:

reliability growth and probabilistic classification

US Navy

My role was as a technical lead with the support of one other data scientist. Our goal was to identify (or in reality narrow down) why some F18 pilots were experiencing hypoxia (lack of quality or quantity of oxygen). Our focus was the ventilation and radar system, but we also had access to full flight data and pilot medical data. We tried many approaches from partial dependence plotting, to deep classification (labels being pilots at risk or not). Our most successful approach was twofold - 1) the comparison of the predictions of two shallow neural networks for sensor readings in the ventilation system and 2) the invention of a new approach to measuring fatigue in the pilots based on their environment. This second approach led to one of my first author patents ("Measuring Fatigue in Assets that Heal"). This work led to two other projects with the Navy supporting 2 data scientist for ~two years.

Sales Leadership :

I acted as a technical lead to support our sales team in a competition for new business. The potential client was a well known European chemical manufacturer. My role was to develop a quick exemplary solution to a number of specific requests by the client. Due to the short amount of time (~2 months), I had a team of ~5 other data scientist to help me. Once the proof of concept solutions were developed, it was my responsibility to fully understand what my team had done so that I could run a full day demo and Q&A at the client's facility in Germany. We did NOT win the business, but the rationale was not due to my performance, rather the state of the (nascent) GE deployment product that the solution would function within. I received feedback from the client through my leadership that my part was impressive.

technical solutions included:

traditional time series forecasting (ARIMAX), Gaussian Mixture Models, R Shiny App development

Mentoring :

In the last few years my role as a casual mentor has increased to a few teammates. There are times that colleagues get frustrated with one thing or another and I try to help give some perspective to help them focus on what is actually important or they just need a sounding board for some solution approach that they want to vet. Here are two examples,

- For example, very often the best technical solution is simply not possible given the existing data from a client. Recently, I've had to help a team mate understand that we have to do the best we can by the client given many (often opaque) constraints. The conversation often boils down to me reminding them that "while deep learning is exciting, powerful and interesting, it's not going to solve every problem - at least not yet."
- Another related example is around introducing technical ideas. Many younger team members have come from the various data science boot camps, which are good but one can only learn a few hammers in a few months. So, I look for opportunities to introduce new and old technical ideas that my colleagues may not have come across yet. These can range from simple things like run length encoding being used for time series compression to newer types of analytics that I have found to be useful, such Granger causal graphs or auto-encoders for anomaly detection on multivariate time series.

Taking Initiative :

- Recently I noticed colleagues on our QA team slowly reading through and categorizing customer issues. I realized that it may be possible to use topic modeling to automate part of their work. I made a quick stab at the analytic portion and it showed enough potential to merit building a web application around it for ease of use, which I am currently building. Depending on the internal success of the tool it could go on to live a more valuable life as part of a GE product.
- As an academic in physics, I was able to both lead and participate in many scientific publications (3 of which are in Nature). As GE does not promote publication as readily as academia, I have instead authored a few patents (listed on my resume) over the years.
- As an interim manager I took the opportunity work with other teams and make the case for access to AWS. Up until that point, all of our work was done on laptops.

Professional Growth :

- I was asked to interview and recommend the hiring of candidates for a new data science team in Paris. The team eventually grew to ~10 people. For a while I acted (along with the lead data scientist on the French side) as a liaison between our two teams to share ideas and business opportunities.
- I was awarded the opportunity to attend a week long leadership training at GE's Crotonville facility.