June 27, 2017

Dear Dr. Davis (Chris),

In response to your letter from 12 June 2017, I am providing my assessment of Dr. Glen Romine’s appointment to Project Scientist III. I first met Glen in June 2003, when we both participated in the ASP Summer Colloquium titled “Data Assimilation for Atmospheric and Climate System Prediction”, while we were both graduate students. We subsequently started working together while enhancing the WRF interface to the DART software. Our closest collaboration was associated with the Mesoscale Predictability Experiment (MPEX). As I have documented throughout the remainder of this letter, I believe Glen’s credentials meet or exceed all of the criteria laid out for someone at the Project Scientist III level.

Since arriving at NCAR, Glen has become one of the world’s leading experts on data assimilation and ensemble forecasting applications for severe convection. Although Glen’s PhD work focused mainly on the assimilation of radar data for convection forecasts, he quickly realized that these observations would have limited value unless the model had a good estimate of the mesoscale environment. Although this idea ran contrary to the prevailing research direction in the field (most other research groups were pursuing radar assimilation), this approach has ultimately proved to be correct since most papers I have seen have shown little value in assimilating radar data unless the mesoscale environment is reasonable. One of the hallmark’s of Glen’s data assimilation work is the quality of the analysis contained in the papers. Unlike many in the data assimilation community, Glen’s papers always strive to understand “why” the results are being obtained. As an example, Romine et al. (2013) used the data assimilation system to diagnose model errors and how these errors impacted the ability to assimilate observations. One of the secrets of data assimilation is that the easiest way to improve the data assimilation system is to improve the model (most try to force the model to get better through data assimilation). The analysis of the MPEX dropsonde impact experiments contained in Romine et al. (2016) contains an equally thorough analysis. In addition, Glen’s collaborations with Judith Berner have yielded the first papers on application of stochastic model error techniques to convection-resolving ensemble forecasts (Romine et al. 2014). Kevin Lupo (my current graduate student) is currently testing the application of SPPT on precipitation forecasts in the Northeast. This paper has become a benchmark for our work and will likely grow in citations in the future.
By far, Glen’s biggest contribution to the field has been his leadership in the development of the NCAR ensemble. This system was originally conceived in 2012 to produce mesoscale analyses for the deterministic real-time convective-resolving forecasts that NCAR has run for years. During the 2013 MPEX experiment (which Glen showed great leadership), the forecasting system was expanded to include ensemble forecasts. This change required significant computational resources, but has had a significant multiplier effect beyond his own work. In addition to providing ensemble forecasts to support operations, my group was able to use the output to evaluate the sensitivity of convective forecasts to forecast fields at earlier times. This work has yielded three publications by my group (Torn and Romine 2015, Torn et al. 2017, Berman et al. 2017), which would not be possible without Glen’s contribution. Subsequently, Glen lead the team that created NCAR ensemble prediction system, which has subsequently become a go-to resource for many in the convective forecasting community and beyond both for the resolution and for the unique visualizations of this large dataset. This system has brought a lot of positive attention to NCAR and has continued the long tradition of MMM’s cutting-edge research in numerical modeling. I have heard many operational forecasters call this a “game changer” when they see it for the first time. Moreover, the efforts of the NCAR ensemble team have embarrassed NOAA into changing their convective modeling strategy. Clearly NOAA is interested in adopting Glen’s ideas as he is PI for three NOAA proposals recently recommended for funding related to this. From a scientific perspective, the NCAR ensemble has yielded numerous papers on forecast evaluation and the output has been provided to other research groups (including some at UAlbany), which is likely to yield additional papers in the future.

Based on Glen’s service activities, it is clear that his peers also consider him a national leader. He has been an the AMS STC committee on Severe Local Storms since 2012 and is currently the chair. He has also been a member of the Severe Local Storms conference planning committee twice. I have been on editor for Monthly Weather Review since November 2015. During that time, Glen has been an associate editor, which are considered trusted reviewers for the editors. Anytime I have a potentially difficult data assimilation paper, I immediately inquire on Glen’s review load because I trust his opinion greatly. Unfortunately, he is often already reviewing other papers, so clearly other editors hold Glen’s opinion in as high regard as I do.

In summary, I believe Glen’s record greatly exceeds the qualifications for a Project Scientist III. He has clearly established himself as an international leader in mesoscale data assimilation and ensemble forecasting. He is highly respected in both the data assimilation and severe convection communities. He is a careful scientist who strives to understand the “why” of the results, rather than just the what. The NCAR ensemble prediction system has been visionary and provided a roadmap for mesoscale forecasting in the United States. My collaborations with Glen have been very fruitful; I have learned a lot about severe convection from Glen during our MPEX experience. Glen’s openness to collaborate with the University community is a model for NCAR. In the future, I will be actively...
seeking ways to collaborate with Glen. Please feel free to contact me if you have any questions about my assessment.

Sincerely

[Signature]

Ryan D. Torn
Associate Professor