CAP-SP

1. Y. Xie, E. Eftelioglu, R. Ali, X. Tang, Y. Li, R. Doshi and S. Shekhar. [Transdisciplinary Foundations of Geospatial Data Science.](http://www.mdpi.com/2220-9964/6/12/395/htm). ISPRS Intl. J. of Geo-Information, 6(12), 2017.
2. **CAP-SP --**Shashi Shekhar, Zhe Jiang, Reem Y. Ali, Emre Eftelioglu, Xun Tang, Venkata M. V. Gunturi and Xun Zhou 2015. [Spatiotemporal Data Mining: A Computational Perspective](http://www.mdpi.com/2220-9964/4/4/2306)

CAP-RP

1. **CAP-RP --** S. Barua and J. Sander, [Mining Statistically Significant Co-location and Segregation Patterns](http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6523223&tag=1), *IEEE Trans. Knowl. Data Eng.*, vol. 26, no. 5, pp. 1185-1199, 2014.
2. **CAP-RP --**Nayak, Guruprasad, Varun Mithal, Xiaowei Jia, and Vipin Kumar. "[Classifying multivariate time series by learning sequence-level discriminative patterns.](https://epubs.siam.org/doi/abs/10.1137/1.9781611975321.29)" In Proceedings of the 2018 SIAM International Conference on Data Mining, pp. 252-260. Society for Industrial and Applied Mathematics, 2018.

Two main areas:

1. Spatial Data Mining and Spatial Statistics
2. Spatial classification and Prediction
3. Group Partner name:  
   Group Partner email address:

Web url to group webpage:

1. In the following courses that I took, the projects were completed in teams:
2. CEGE 5180: Ecohydrology
3. EE 5561: Image Processing

Overall experience was very good. More specifically in Image Processing course, the group of 3 were from three different fields viz. Civil Engineering, Mechanical Engineering and Electrical Engineering. This made for a great learning for all of us about the application of that particular project in each of our disciplines.

1. In the EE class project, our group performance didn’t quite follow the stages as mentioned in Tuckman’s stages of group development. All of the group members were very responsible which made the group sorted well before the performance time. Everyone had their opinion about how the project should proceed and luckily we had it come to convergence way sooner than expected. All of us met twice every week to ensure that we were making enough progress on the project.
2. I agree with the first solution in the article about talking to the group member. I would add that the most effective way to deal with this problem would be to act before it even happens. By this I mean speaking about the expectations of the project participation with the group members on the very first meeting. This ensures that the group partner understands everyone’s contribution and expectations way ahead of time before conflict arises.
3. I totally agree with the article’s suggestion of stopping first reaction. I would like to stress that this suggestion goes for any type of criticism whether it be constructive or not. I have actually applied this solution for replying to the peer review of my two submitted manuscripts. Most of the opinions by reviewers are genuine and helpful but sometimes you get responses that are completely out of context. All the manuscripts that I wrote are deeply connected to me and handling criticism on them is not easy. But over the course of time, I have learned that whenever you get criticized for your work and it gets into your nerve, it is wise to control your impulse. I usually take a short walk or listen to music for about an hour and then come back to it. By coming back to it after a while gives me a better perspective and makes me try to better understand and react responsibly.
4. In the graduation speech, Chief Justice Roberts raised some remarkable points about failure. One of the best lines I found about his speech although not previously unheard of is “You shouldn’t be yourself, you should try to become something better”. I have always been great admirer of this notion and believe that people should come out of their comfort zone to become a better version of themselves. Although I would like to admit that following this notion has brought hardship on the way but has always proved fruitful. For example, my PhD research is focused on data assimilation (DA) techniques for bias correction. This is considered one of the most complicated problems in geophysics let alone water resources (my specialization in Civil Engineering). With my advisor’s permission, I decided to tackle this problem during my PhD research. The first two years were tough to say the least given the amount of reading I had to do to find the potential solutions to this problems. I was taking classes in Mathematics, Electrical Engineering and Computer Science to find solution. I was talking to professors in all the aforementioned field. Finally, I found a solution in the field of optimal mass transport stemming from Mathematics. We conducted our analysis and proved that our DA technique performs better than current bias correction strategies and submitted our manuscript.

7. PhD in Civil Engineering/MS in Computer Science

8. (b) Geographic Information Systems

9. ``Improving prediction of precipitation extreme using climate indices”

10. (d) I am a PhD student, and would like to get something almost publishable from the course project. It could be for my WPE or to initiate a relation

11. Yes, I have prior experience in reviewing papers and finding knowledge gaps. For example, my recent paper in Journal of Climate titled “Linking Global Changes of Snowfall and Wet-bulb Temperature” was specifically focused on filling knowledge gap in historical changes in Global snowfall. As is known, precipitation gauges are very sparse especially over high altitudes and latitudes, thus cannot provide a global picture of changes. Moreover, satellite sensors for measuring snowfall are recently launched with no information about historical changes in snowfall. We combined the information of wet-bulb temperature, a better predictor of precipitation phase than air temperature, with total precipitation amount to infer changes in snowfall.

12. Given the plethora of information and geometric increase in publication numbers, google scholar is sufficient (one might need to tailor the search to prevent thousands of unrelated search results). However, going over books, attending seminars and talking to experts on related topics prove to be more comprehensive.

13. For both of my past papers on climate change and Data assimilation (currently under review), we focused on robustness of the methodology and data in use. To prevent any bias in the results due to a particular choice of reanalysis products, we obtained the three well known reanalysis products and combined them using inverse variance weighting to account for uncertainty. We showed that the combined reanalysis product and our methodology of inferring snowfall from wet-bulb temperature performed better than the reanalysis product (bias of 1.06% vs 34.69%). This bolstered the confidence of three anonymous reviewers on our work and we mostly received constructive feedback.

14. (c) Ask a known authority of the field (e.g. a leading scientist in the area, a popular book) and   
(d) Develop hypotheses and perform test them via controlled experiments.

15. Scientifically well known: (a) Global climate warming and (b) algorithm with O(log N) faster than O(N) time complexity and (g) Self-driving cars can solve societal problems, e.g., congestion, urban sprawl, and mobility inequality.

Scientifically unknown: (c) Will Gophers' football team beat Penn State in the next game?  
(d) Is there a way to mine GPS tracks without violating people's privacy? (e) Can social media induce healthy behaviour? (f) Is there a consensus on data model for building interior for shortest path query?

16. (a) Data mining vs Data Science

Data mining is a sub-discipline of Data science which deals with finding useful information from data.

(b) Classical statistics vs spatial statistics

Spatial statistics unlike classical statistics uses spatial information such as colocation or segregation to infer more information from a given data. Furthermore, a lot of classical statistical tools such as regression and autocorrelation cannot be directly applied as they don’t respect the spatial structure and might lead to results that are not spatially consistent.

(c) Graph vs. Spatial networks

Graph refers to the relationship between a set of vertices representing objects and set of edges representing relationship between edges. Spatial networks is a special kind of graph in which the aforementioned vertices and edges are spatial components of a geometric object.

(d) Scientific values (norms): reproducibility vs peer review

Reproducibility refers to the scientific norm that the experiments if conducted under identical scenario and parameters in use, the results should be consistent with one another. The manuscript submitted for publications in a journal should elaborate the methodology reasonably well that the experiments can be repeated to check for reproducibility.

Peer-review: Peer-review process is a scientific approach to get feedback on the work by researchers. Without peer-review, the authenticity of the work is in question. Peer-review helps to improve the quality of the research.

(e) GeoAI is a sub-discipline of AI that combines the spatial knowledge from Geographic Information system with methodology of AI.

(f) Scientific claim vs Marketing ads

Scientific claims are facts stated regardless of the people opinion whereas marketing ads are distorted information tailored to the audience interest.