



BIDAC project update

Develop image processing pipeline for
ex-vivo DTI of mouse models

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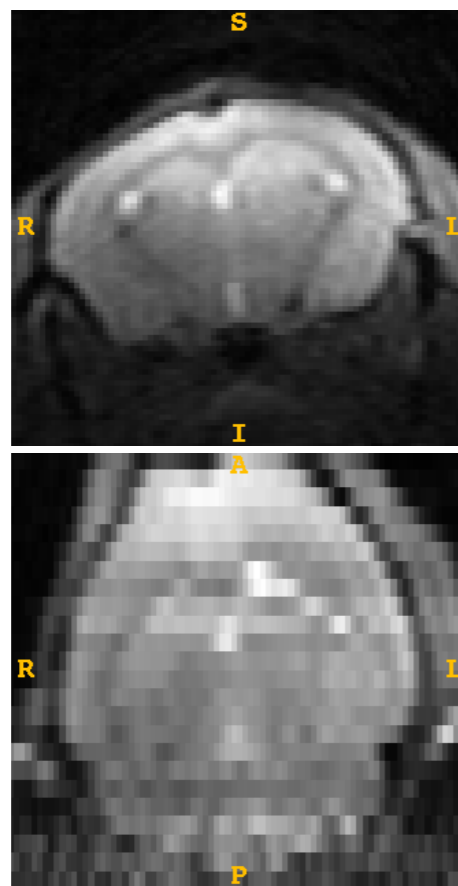
February 2015



Project update

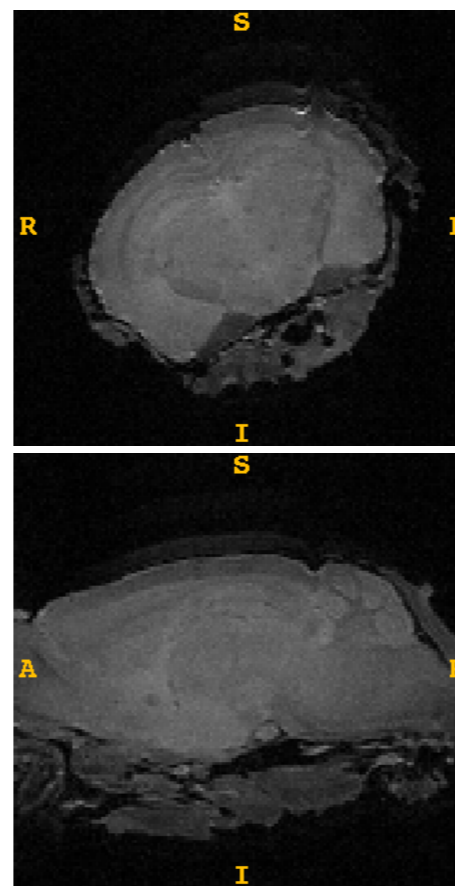
1) Optimization of ex-vivo DWI mouse brain acquisitions in collaboration with Small Animal Imaging core

DWI InVivo



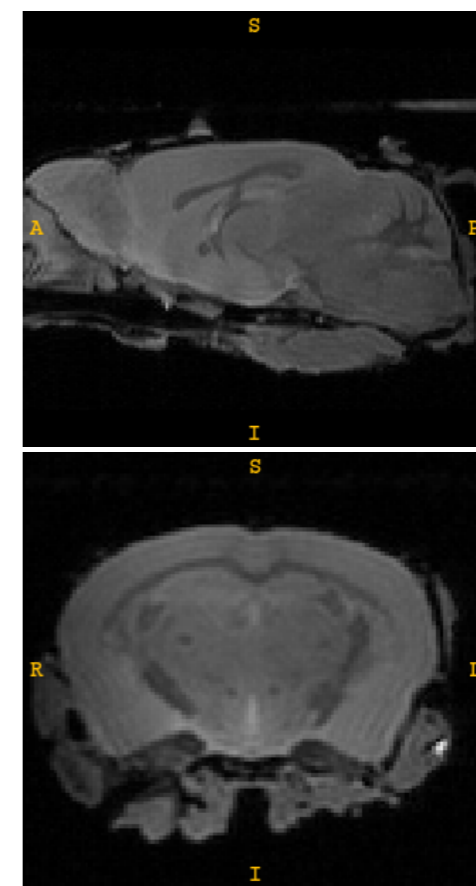
B0 image
0.15x0.15x0.5 mm³
(68-dir DWI)

DWI ExVivo



B0 image
0.13x0.13x0.1 mm³
(68-dir DWI)

DWI ExVivo



B0 image
0.13x0.13x0.1 mm³
(12-dir DWI)

Project update

2) Adaptation of image processing framework from human imaging to small animal imaging

3) DTI analysis

- **Method:** group-wise analysis
 - DTI atlas generation from population
 - Use of Brookhaven public parcellation
- **Test on an ongoing study:**
 - 3 Knock-Out (KO) mice
 - 5 Wild-Type (WT) mice

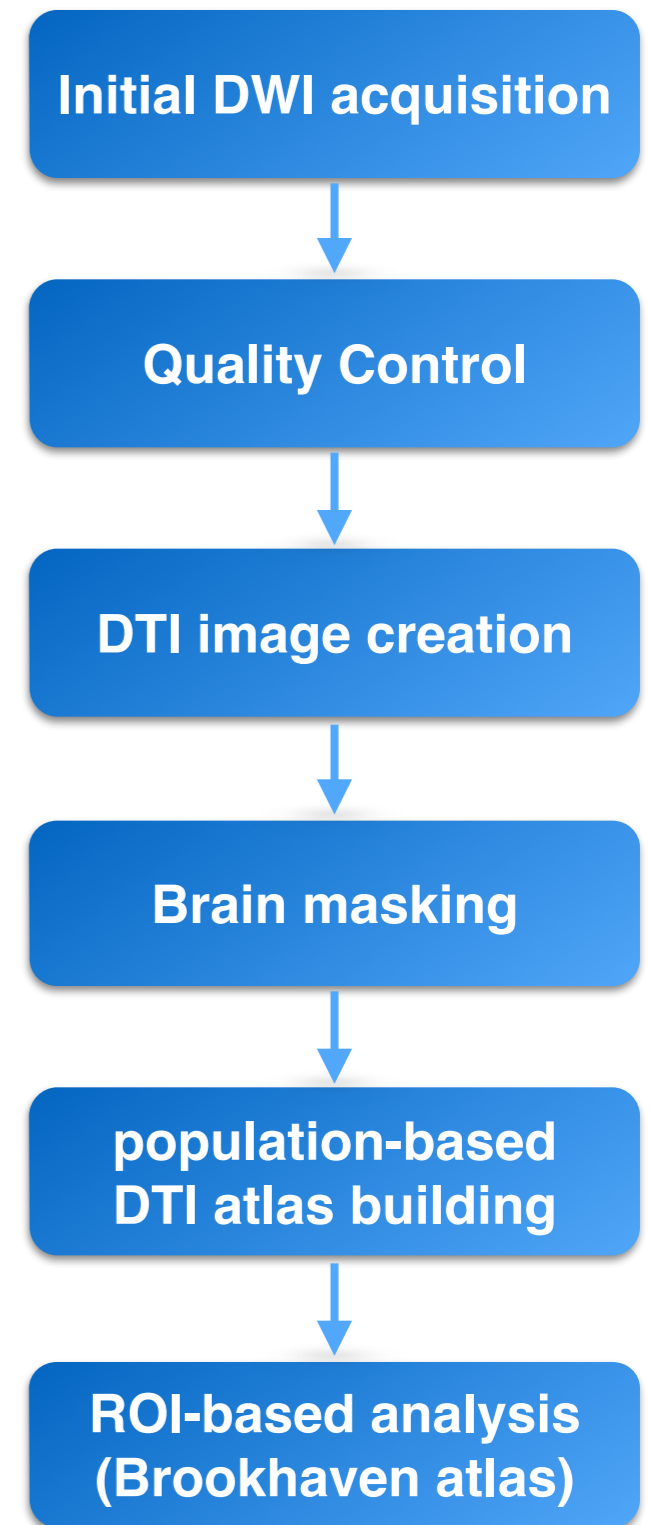
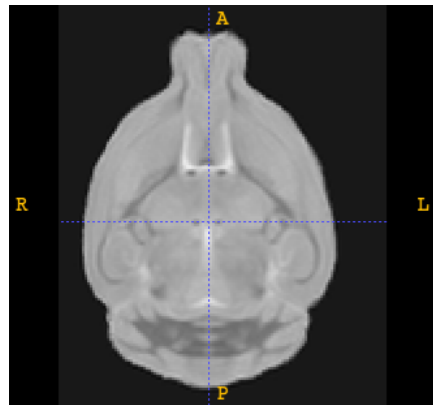


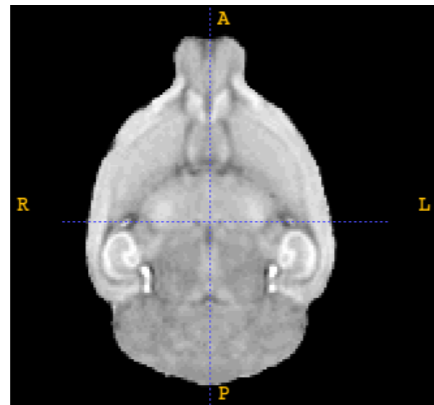
Figure: Image processing framework

Screenshots: DTI atlas

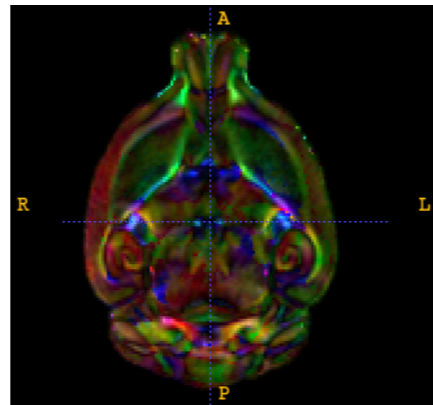
B0



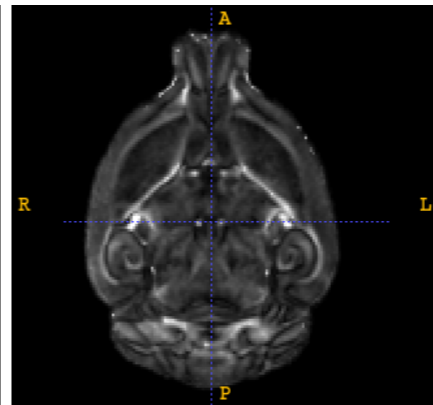
MD



colorFA



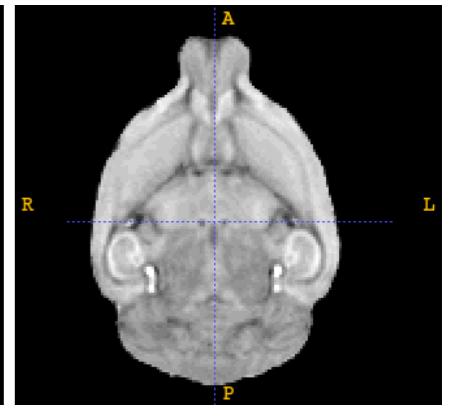
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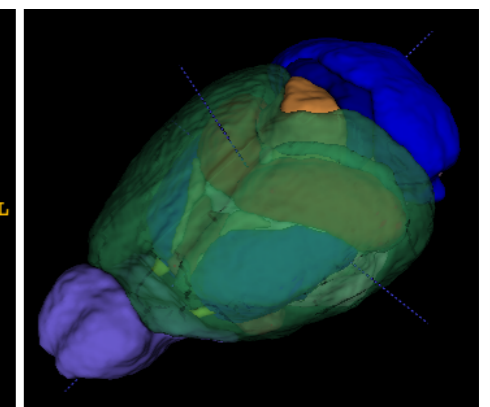
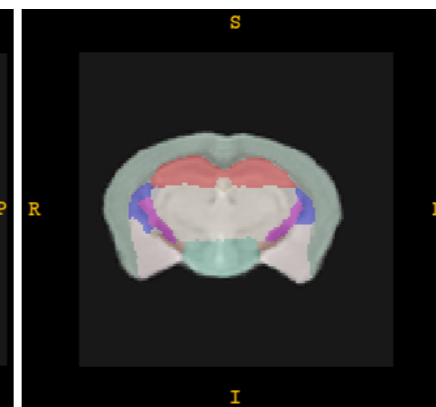
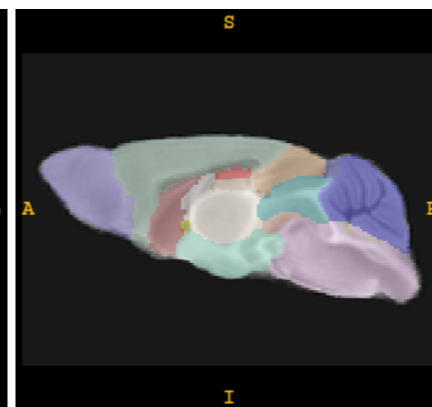
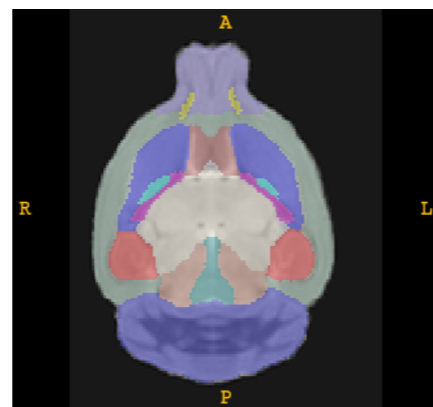
AD



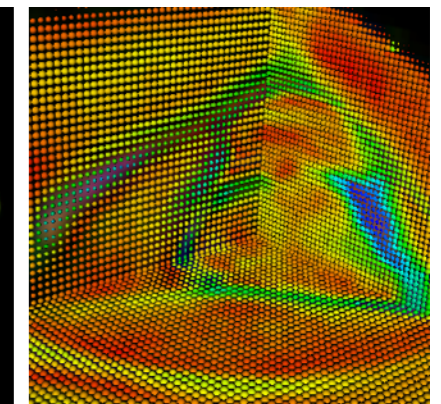
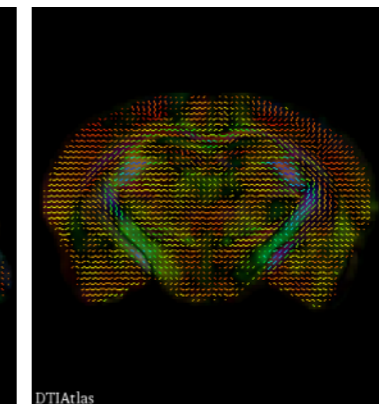
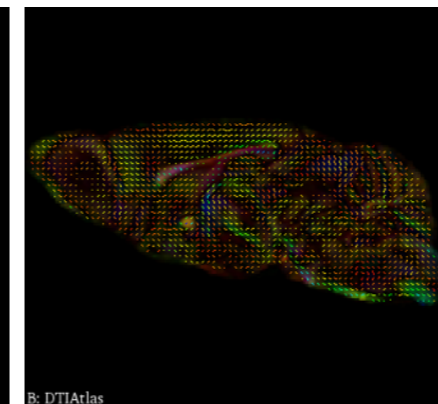
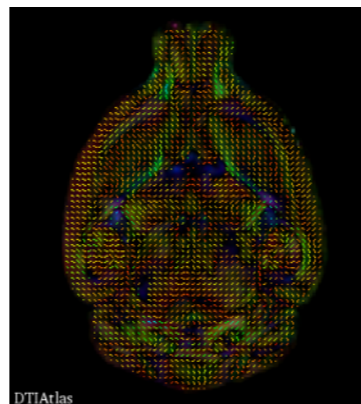
RD



B0 with Brookhaven atlas parcellation



color FA image with tensor representation



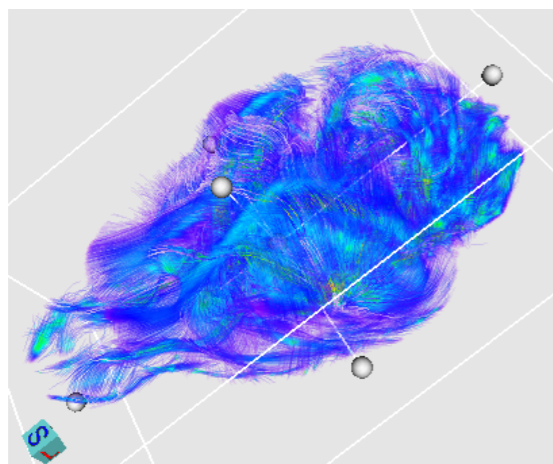
Conclusion

- **Contributions**

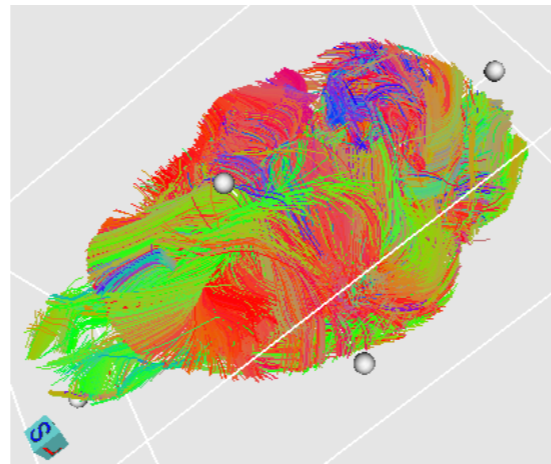
- Developed joint expertise and Utah HSC capabilities for mouse image acquisition and analysis
- Processing and statistical analysis were tested on ongoing study of a Hoxb8 mouse model of OCD (Obsessive Compulsive Disorder)
 - This will lead to co-authored publication and potential future grant writing

- **Next steps**

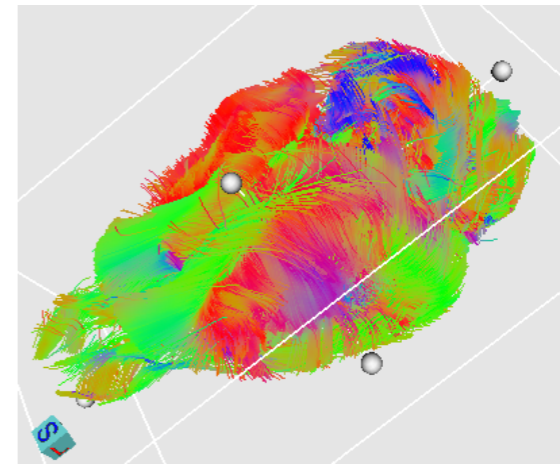
- Tract-based analysis



Color by FA



Color by global orientation



Color by local orientation