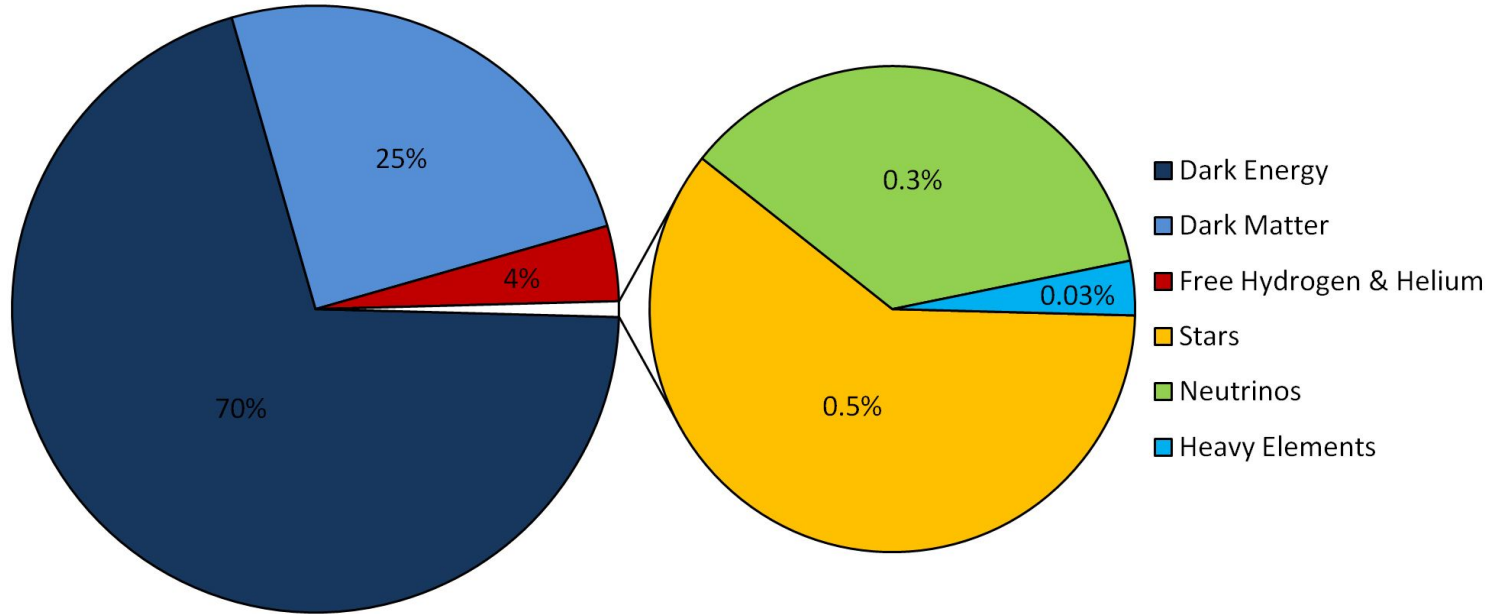# Teaching Machines to "See" Diffuse Galaxies

Name: Caleb Levy
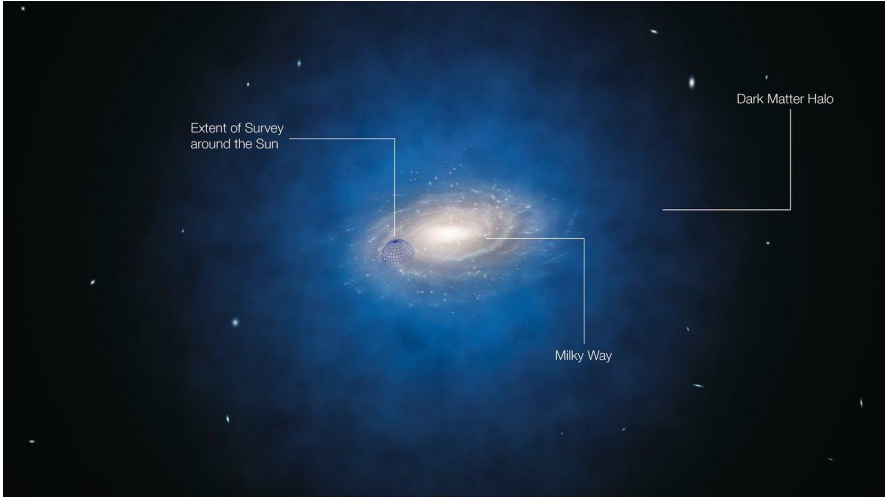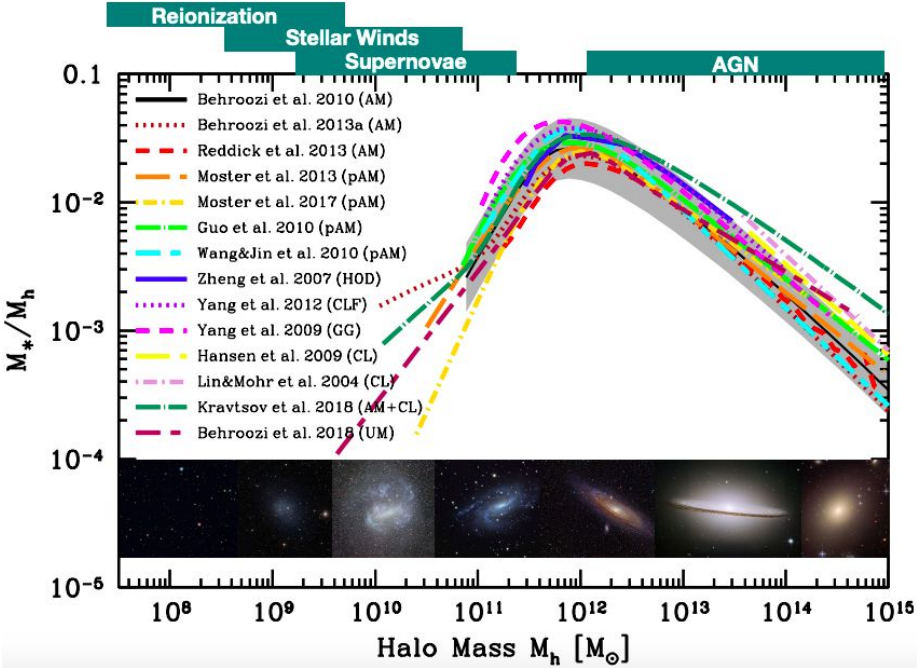Advisor: Alex Drlica-Wagner
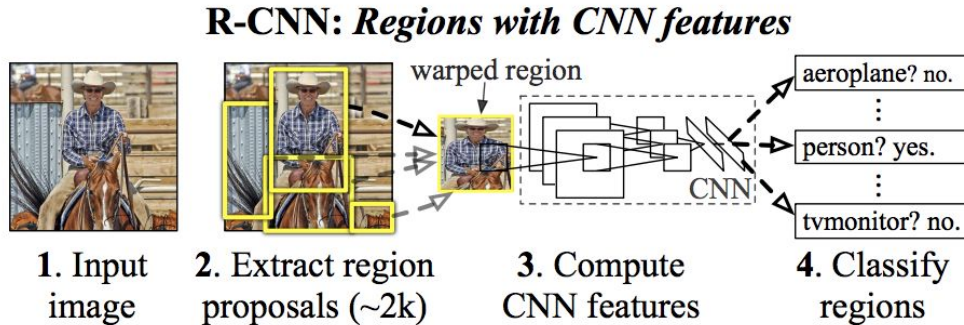5 minutes, 5 slides

Background

- **Dark Matter makes up most of the matter in the universe.**
- **But we know almost nothing about it!**
- **How can we get a better picture of Dark Matter's role in the universe?**
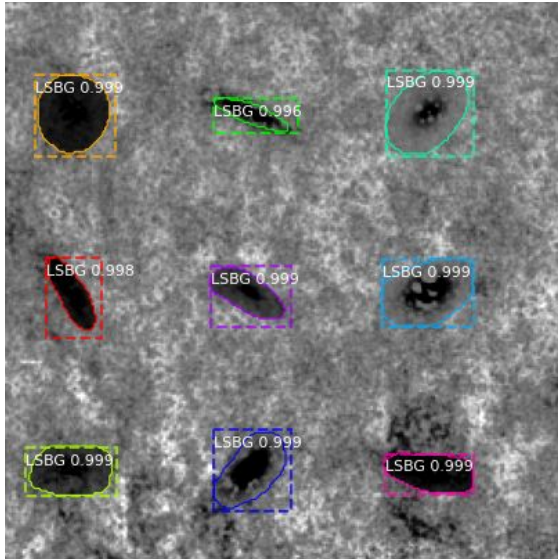
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Galaxy-Halo Connection

Computer Vision: Mask R-CNN

R-CNN: *Regions with CNN features*

1. Input image
2. Extract region proposals (~2k)
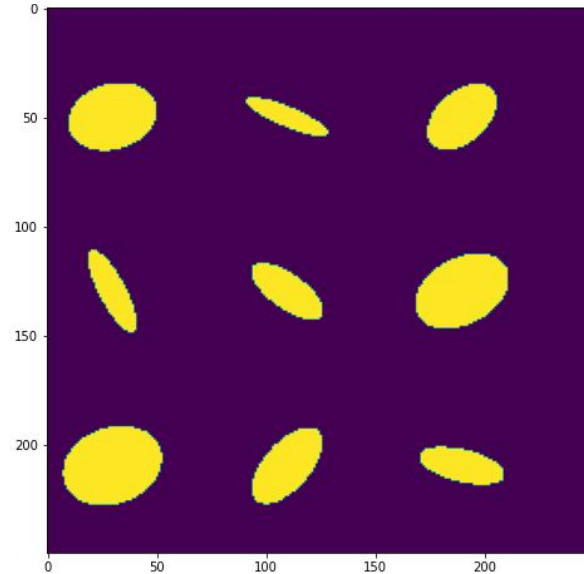3. Compute CNN features
4. Classify regions

- **CNN: Convolutional Neural Network → Extracts Local Features**
- **R-CNN: Region-based CNN → Puts boxes around objects**
- **Mask R-CNN → Places mask around objects**

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Project for Summer

- Create model trained on simulated LSBGs
- Compare detection sensitivity to standard algorithms
- Use model to detect new LSBGs in DES data!

DES Image

Position of Simulated LSBGs

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