The **Calculus courses at WPI** include an active-learning lab that incorporates real-world problems, mathematics and computer software to delve into many topics of mathematics. Topics covered in these Calculus labs are varied and give a deeper insight into the topics students are learning in Calculus. We work on **Riemann sums** with weather maps.

![Average Annual Precipitation Connecticut](image)

We work on **geometric series** with loans and annuities.

![Geometric series with loans and annuities](image)

We work on **center-of-mass** using body density functions with athletics.

![Center-of-mass](image)

We work on **polar coordinates** with cardioid microphones.

![Polar coordinates with cardioid microphones](image)

We work on **exponential growth** with bacteria experiments.

```matlab
> geo -t-> 525*xexp(k*t) /
> k = k;
> k = solve(geo(5)=1050, k);
> k = ln(10)/k
> evalf(geo(36));
```

We work on **improper integrals** and probability density functions with insurance claims.

```
Density function:
> f = (x, k) -> x^a / (x + b)^(a+1):
> f = (x, k) -> x^a / (x + b)^(a+1):

Plot that it equals-moment of 3 or 10%:
> plot([f(3), 3], [f(10), 1], x=0..infinity):
> plot([f(3), 3], [f(10), 1], x=0..infinity):
```

![Improper integrals and probability density functions](image)
The software used in the active-learning labs includes:

- Maplesoft
- MathWorks® MATLAB
- GeoGebra
- Microsoft Excel
- desmos