

THE IMAGEJ OPS FRAMEWORK

IMAGE PROCESSING MADE EASY

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WHAT'S THE PROBLEM?

- image processing consists of a pipeline
- each pipeline consists of operations
- many users find it complicated to build pipelines for their tasks

OPTIONS FOR IMAGE PROCESSING AND ANALYSIS:

- easy-to-use applications for most common operations
- extensions (modules, plugins)
- scripting

WOULDN'T IT BE NICE IF WE HAD SOMETHING...

- easy to use, to extend and to maintain?
- that handles large amounts of data?
- that is blazing fast?



- We have a community!
- We have experience with collaborative development!
- We have the SciJava framework and ImgLib2!

A LITTLE EXCURSION THE SCIJAVA FRAMEWORK

- Reuse
- Extend
- Be empowered!

DEFINING A PLUGIN TYPE

```
public interface Greeter extends SciJavaPlugin {  
    public String sayHello();  
}
```

IMPLEMENTING A PLUGIN TYPE

```
@Plugin(type = Greeter.class)
public class HelloWorld implements Greeter {
    @Override
    public String sayHello() {
        return "Hello, world!";
    }
}
```


EASY TO USE

```
# @ImageJ ij

blank = ij.op().createImg(150, 100)
formula = "10 * (Math.cos(0.3*p[0]) + Math.sin(0.3*p[1]))"
sinusoid = ij.op().equation(blank, formula)

ij.op().add(sinusoid, 13.0)

gradient = ij.op().equation(ij.op().createImg(150, 100), "p[0]+p[1]")

composite = ij.op().createImg(150, 100)
ij.op().add(composite, sinusoid, gradient)

ij.ui().show("sinusoid", sinusoid)
ij.ui().show("gradient", gradient)
ij.ui().show("composite", composite)
```

Note: Due to heavy development, this code does not currently work in Fiji.

EASY TO EXTEND

```
@Plugin(type = Op.class, name = "narf")
public static class Narf implements Op {

    @Parameter(type = ItemIO.BOTH)
    private String string;

    @Override
    public void run() {
        string = "Egads! " + string.toUpperCase();
    }
}
```

LARGE DATA

Of course! Thanks to [ImgLib2](#)!

FAST?

- Well, yes! (The trick is code generation...)
- What about CUDA (GPU computing)? ... SciJava plugins!
- Balancing development time vs execution time
Compare [xkcd: Is It Worth the Time?](#)

STATUS: ALPHA

- Under heavy development
- API changes
- A lot of fun!
- <https://github.com/imagej/imagej-ops>

THANKS!

- **The ImgLib2 developers**

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