



# Differential Evolution Algorithm and Graphical User Interface

**A graphical user interface for optimizing cryopreservation solutions using the differential evolution algorithm.**

## Differential Evolution Interface

A new graphical user interface (GUI) guides users easily through the process of implementing Storn and Price's differential evolution algorithm for optimization applications, such as in optimizing solution compositions for freezing media for a cell type. Not only does this software program customize the algorithm for optimizing solution compositions, but a user-friendly GUI prompts users through the process step by step. The GUI provides the required fields for data entry, so users don't need coding expertise, and it checks the validity of the data entered to minimize mistakes. The software analyzes, compares and mutates the data to predict a new set of solutions likely to improve cell recovery after freezing.

## Predicts Solution Compositions

The customized software saves the user time by performing additional calculations that would normally be done in Excel or by hand, and it keeps the user from having to further process the data to determine solution volume compositions. The algorithm predicts new solution compositions that include both the vector compositions as well as corresponding volumes based on the stock concentrations, and these compositions can be pipetted right away, without any additional calculations to convert algorithm vectors to volume compositions.

## BENEFITS AND FEATURES OF DIFFERENTIAL ALGORITHM AND GRAPHICAL USER INTERFACE:

- Customized for optimizing solution compositions
- Graphical user interface (GUI) simplifies using the Storn and Price algorithm
- Predicts solution compositions that can be used right away
- Saves time and prevents user error
- Includes vector compositions as well as corresponding volumes

**Phase of Development** - Software prototype is available via the [Open Source GPL v2.0 license](#), or contact [exprlic@umn.edu](mailto:exprlic@umn.edu) for Non-GPL licensing.

## Researchers

Kathryn Lindsay Pollock

*Research Assistant, Mechanical Engineering, College of Science and Engineering*

Allison Hubel, PhD

*Professor, Mechanical Engineering, College of Science and Engineering*

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