

# uMelt Batch<sup>SM</sup> User Guide

Created by Zachary Dwight

The screenshot shows the homepage of DNA-UTAH.ORG. At the top is a banner with the text "DNA-UTAH.ORG" and a map of Utah. Below the banner is a navigation bar with links: Home, Publications, About Us, About the Lab, Contact Us, and Utah. A search bar is located below the navigation bar. The main content area is divided into several sections: "What we do" (listing High-Speed Melting, Extreme PCR, High-Resolution Melting, LightCycler PCR, and Rapid-cycle PCR), "Top Software" (listing uMelt, uAnalyze, uVariants, T<sub>m</sub> Tool, and Digital PCR), "Resources" (listing Publication Database, Lectures, Posters, Dye Database, Genetic Code Map, and PCR Animations), "Welcome!" (a general introduction to the portal), "Software" (a list of featured software tools with update notices), and "Extreme PCR" (a section featuring a gel electrophoresis image and text describing the technology).

## DNA-UTAH.ORG

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Search this site

### What we do

- High-Speed Melting
- Extreme PCR
- High-Resolution Melting
- LightCycler PCR
- Rapid-cycle PCR

### Top Software

- uMelt<sup>SM</sup>
- uAnalyze<sup>SM</sup>
- uVariants<sup>SM</sup>
- T<sub>m</sub> Tool
- Digital PCR

### Resources

- Publication Database
- Lectures
- Posters
- Dye Database
- Genetic Code Map
- PCR Animations

### Welcome!

This portal delivers digital content exploring simple and rapid methods for nucleic acid analyses, with goals to provide better ways to expedite research and perform clinical diagnostic tests. For nearly three decades, the Wittwer Lab for DNA Analysis developed many innovative technologies now commonly used in research and clinical applications.

### Software

Through our new digital site (formerly dna.utah.edu), we will continue to provide accessible, high-quality and easy to use software that is free of registration and cost. We hope to provide our expertise, to the best of our ability, in software form to help all those that seek it.

#### Featured

- uMelt : Melting Curve Prediction
- T<sub>m</sub> Tool : Melting Temperature Prediction Software **Updated!**
- uVariants : SNP Information & Sequence Context App **New Features!**
- uAnalyze v2.0 : Melting Normalization and Analysis Tool **Updated!**
- PrimerSPY : Template Driven Small Amplicon Primer Design **BETA!**
- MeltPubs: Publications Database Related to Melt Curve Analysis
- External Software Links : Useful tools and sites for Assay Development **Updated!**

### Extreme PCR

PCR is a key technology in molecular diagnostics with an ability to amplify and quantify specific DNA fragments in less than an hour. Recently developed, [Extreme PCR](#) can be accomplished in 15-60 seconds and was developed while investigating the kinetic limits of PCR.

[Learn More at Clinical Chemistry](#)

The gel electrophoresis image shows four lanes of PCR products. The lanes are labeled with PCR Time (s): 11.2, 14.7, 18.2, and 21.7. The y-axis is labeled with DNA fragment sizes: 75 bp, 50 bp, and 25 bp. The bands in each lane are at approximately 75 bp, 50 bp, and 25 bp, with intensity increasing from left to right.

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# About uMelt Batch

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## Address:

`dna-utah.org/umelt/quartz`

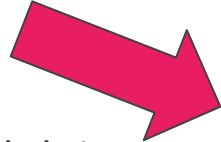
## Publication:

`https://academic.oup.com/bioinformatics/article/27/7/1019/232651`

# GUI

Much like the original Flash version of uMelt Batch, defaults are in and already selected.

Copy and paste your sequences (delimited by comma) into the box below:



Note: 8 seq limit!

## uMelt Batch

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MELT CURVES DERIVATIVE PLOT  All Curves  Composite

Thermodynamics

Free [Mg<sup>2+</sup>]  mM

[Mono<sup>+</sup>]  mM

DMSO  %

Salt Correction

Resolution

Sequence Information: # of Products = 2

```
ACGACGTTGTAAAACGACAGAAGCATAGTATAGAAGAAAAACAGCGCGCGGGCGCCAACACATTCAACTCTGCCACC
ATGGGGAACTGGGCTGTGAATGAGGGGCTCTCCATTTTGTGTCATTGTAAGTACCAACAAGAGATAAGT, TAGCTACGATC
GATATATTATATCGTACGCGTGGATGCTCGTACGATCGCTAGCCCGCGCGGGCGCGC
```

# Parameters

Match parameters to those closest to your laboratory or PCR conditions to obtain a more accurate melting prediction:

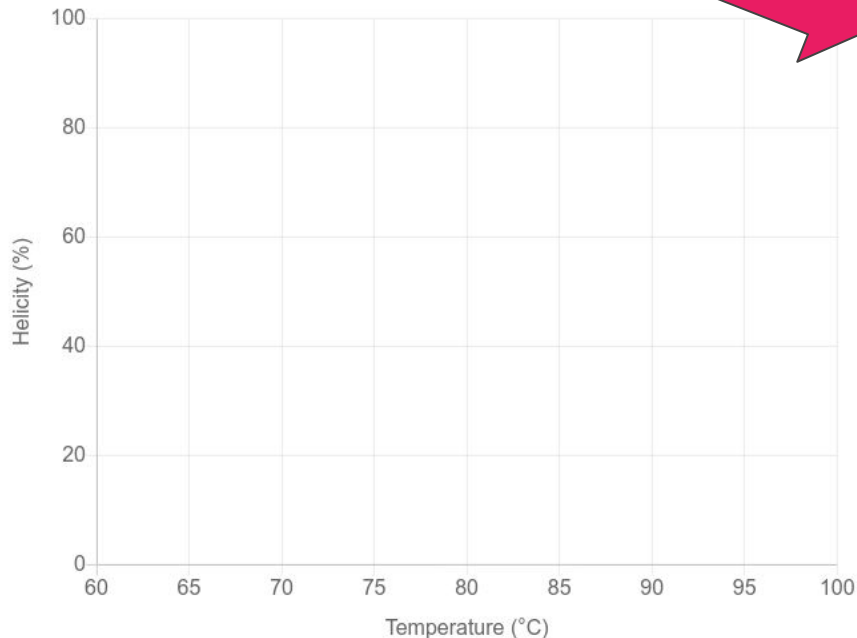
uMelt Batch

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MELT CURVES

DERIVATIVE PLOT

All Curves  Composite



Thermodynamics

Unified SL (1998)

Free [Mg<sup>2+</sup>]

3.0

mM

[Mono<sup>+</sup>]

20.0

mM

DMSO

0

%

Salt Correction

SL & Hicks (2004)

Resolution

Medium - 0.50 °C

RUN UMELT

EXPORT DATA

Sequence Information: # of Products = 2

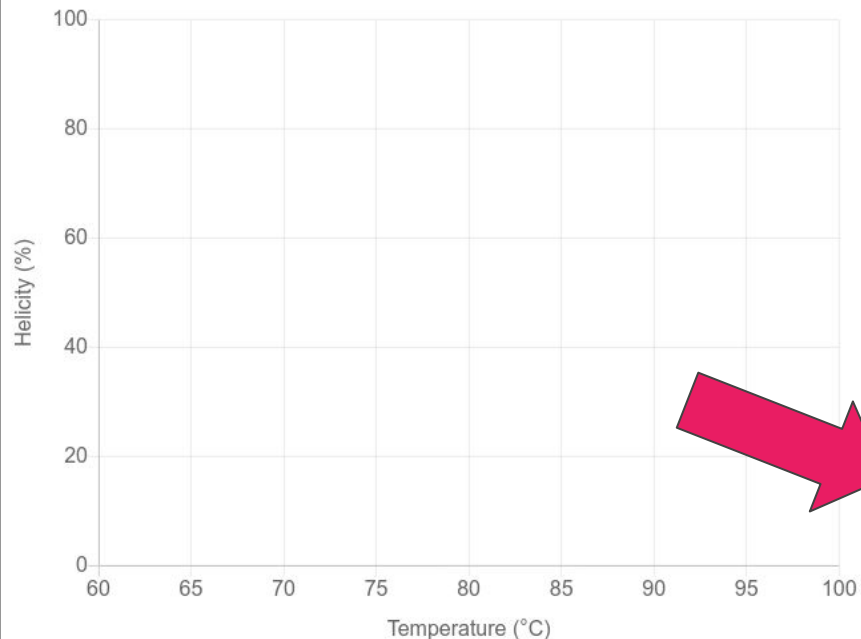
```
ACGACGTTGTAAAACGACAGAAGCATAGTATAGAAAGAAAAACAGCGCGCGGGCGCCAACACATTCAACTCTGCCACC  
ATGGGGAACCTGGGCTGTGAATGAGGGGCTCTCCATTTTGTGTCATTGTAAGTACCAACAAGAGATAAGT, TAGCTACGATC  
GATATATTATATCGTACGCGTGGATGCTCGTACGATCGTAGCCCGCGCGGGCGCGC
```

# Resolution

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The density of predicted points can be adjusted. More points provides smoother curves but calculation time takes longer:

MELT CURVES DERIVATIVE PLOT  All Curves  Composite



Thermodynamics

Free [Mg<sup>2+</sup>]  mM

[Mono<sup>+</sup>]  mM

DMSO  %

Salt Correction

Resolution

Sequence Information: # of Products = 2

```
ACGACGTTGTAAAACGACAGAAGCATAGTATAGAAAGAAAAACAGCGCGCGGGCGCCAACACATTCAACTCTGCCACC  
ATGGGGAACTGGGCTGTGAATGAGGGGCTCTCATTTTTGTTCATTGTAAGTACCAACAAGAGATAAGT, TAGCTACGATC  
GATATATTATATCGTACGCGTGGATGCTCGTACGATCGTAGCCCGCGCGGGCGCGC
```

# Run!

When all the inputs and parameters are set - click the 'Run uMelt' button:

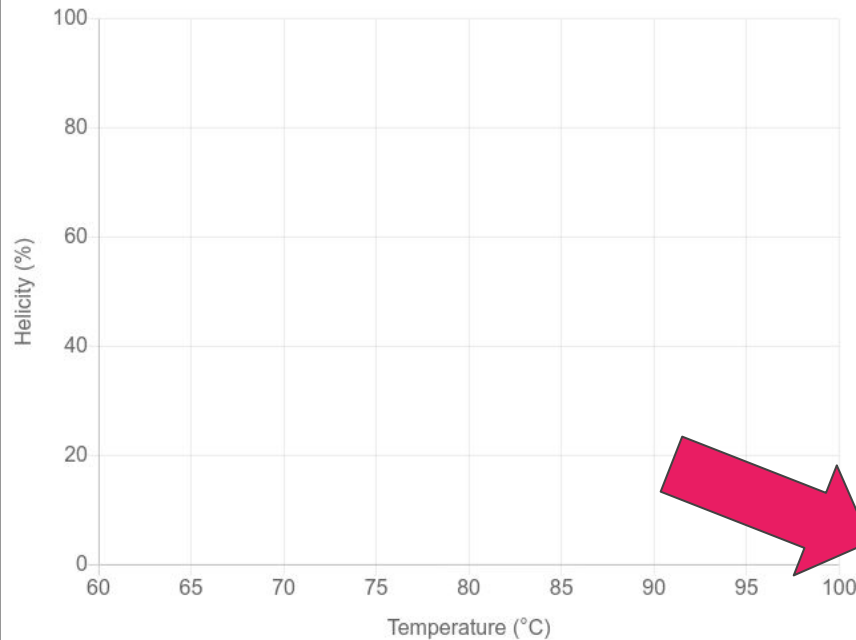
## uMelt Batch

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MELT CURVES

DERIVATIVE PLOT

All Curves  Composite



Thermodynamics

Unified SL (1998)

Free [Mg<sup>2+</sup>]

3.0

mM

[Mono<sup>+</sup>]

20.0

mM

DMSO

0

%

Salt Correction

SL & Hicks (2004)

Resolution

Medium - 0.50 °C

RUN UMELT

EXPORT DATA

Sequence Information: # of Products = 2

```
ACGACGTTGTTAAAACGACAGAAGCATAGTATAGAAGAAAAACAGCGCGCGGGCGCCAACACATTCAACTCTGCCACC  
ATGGGGAAC TGGGCTGTAATGAGGGGCTCTCATT TTTGT CATTGTAAGTACCAACAAGAGATAAGT, TAGCTACGATC  
GATATATTATATCGTACGCGTGGATGCTCGTACGATCGTAGCCCGCGCGGGCGCGC
```

# Melt Curve

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Melting curves are graphed upon calculation completion. This view is good for comparing potential product Tms.

By default, 'All Curves' is selected. This option assumes all PCR products have a dedicated well.

### uMelt Batch

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MELT CURVES DERIVATIVE PLOT  All Curves  Composite

Thermodynamics: Unified SL (1998)  
Free [Mg<sup>2+</sup>]: 3.0 mM  
[Mono<sup>+</sup>]: 20.0 mM  
DMSO: 0 %  
Salt Correction: SL & Hicks (2004)  
Resolution: Medium - 0.50 °C

Sequence Information: # of Products = 2

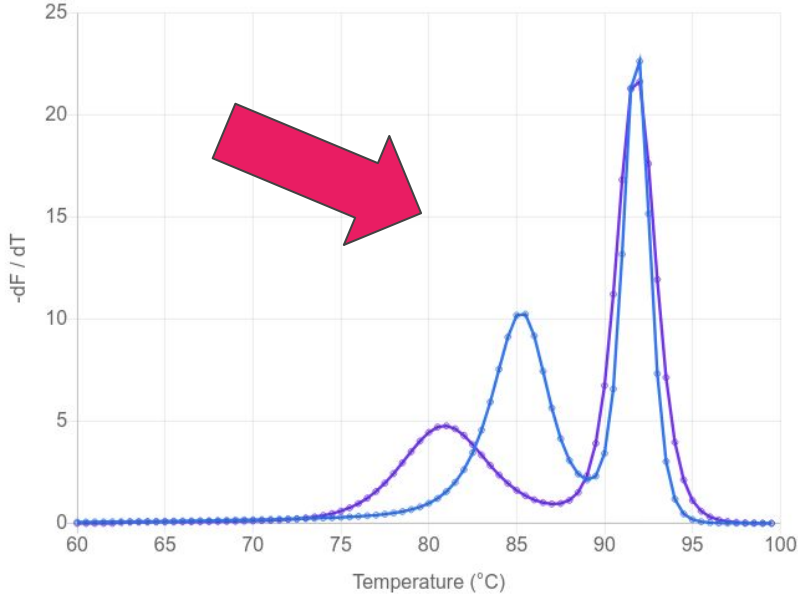
```
ACGACGTTGTAACGACAGAAAGCATAGTATAGAAGAAAAACAGCGCGCGCGCCCAACACATTCAACCTTGCACC  
ATGGGGAAC TGGCTGTGAATGAGGGCTCTCCATTTTGTCAATTGTAAGTACCAACAAGAGATAAGT, TAGCTACGATC  
GATATATTATATCGTACGGCTCGATGCTCGTACGATCGCTAGCCCGCGGGCGCGC
```

# Derivative Plot

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Derivative plots are also available:

MELT CURVES DERIVATIVE PLOT  All Curves  Composite



Thermodynamics: Unified SL (1998)

Free [Mg<sup>2+</sup>]: 3.0 mM

[Mono<sup>-</sup>]: 20.0 mM

DMSO: 0 %

Salt Correction: SL & Hicks (2004)

Resolution: Medium - 0.50 °C

Sequence Information: # of Products = 2

```
ACGACGTTGTAAAACGCAGANGCATAGTATAGAAGAAAAACAGGGCGGGGGCCACACATTCAACTCTGCACCC  
ATGGGAACTGGGCTGTGAATGAGGGCTCTCCATTTTGTGCTTGTAACTACCAACAAGAGATAAGT, TAGCTACGATC  
GATATATTATATCGTACGGCTGATGCTCGTACGATCGCTAGCCCGGGGGGGCGCC
```



# Composite

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When multiple PCR products are melted in a single tube or well - a composite melting curve is observed. To simulate this, click the composite option above to obtain the sum of curves:

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MELT CURVES DERIVATIVE PLOT  All Curves  Composite

Thermodynamics: Unified SL (1998)

Free [Mg<sup>2+</sup>]: 3.0 mM

[Mono<sup>+</sup>]: 20.0 mM

DMSO: 0 %

Salt Correction: SL & Hicks (2004)

Resolution: Medium - 0.50 °C

RUN UMELT EXPORT DATA

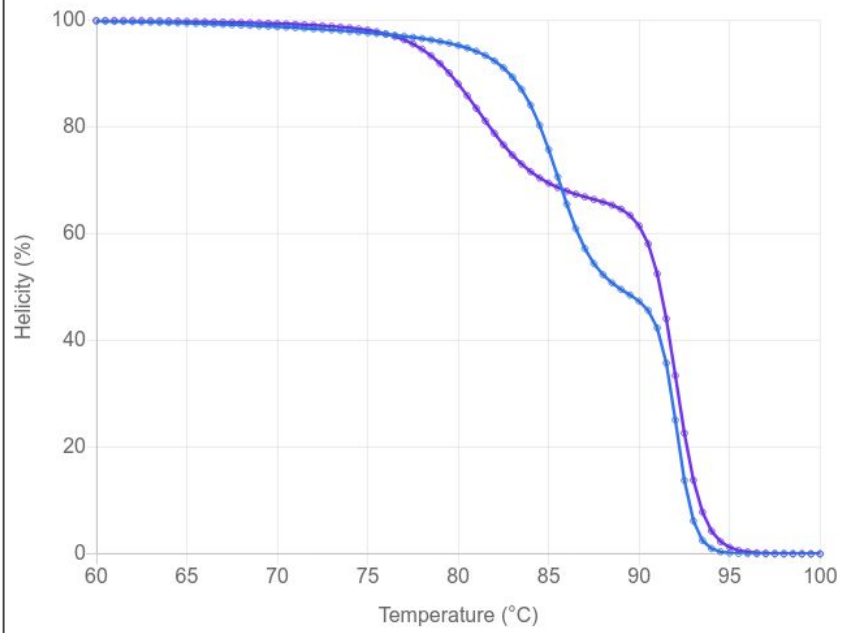
Sequence Information: # of Products = 2

```
ACGACGTTGTAAAACGACAGAAGCATAGTATAGAAGAAAAACAGCGCGCGGGCGCCAAACATTCAACCTCTGCCACC
ATGGGGAACTGGGCTGTGAATGAGGGCTCTCCATTTTGTGTCATTGTAAGTACCAACAAGAGATAAGT, TAGCTACGATC
GATATATTATATCGTACGCGTCGATGCTGCTACGATCGCTAGCCCGCGCGGGCGCGC
```

# Data Export

Use the 'Export Data' button to download all the graph outputs (melting and derivative and composites) to .csv file:

MELT CURVES DERIVATIVE PLOT  All Curves  Composite



Thermodynamics

Free [Mg<sup>2+</sup>]  mM

[Mono<sup>+</sup>]  mM

DMSO  %

Salt Correction

Resolution



Sequence Information: # of Products = 2

```
ACGACGTTGTAAACGACAGAAGCATAGTATAGAAGAAAAACAGCGCGCGGGGCGCAACACATTCAACCTCTGCCACC
ATGGGGAACTGGGCTGTGAATGAGGGGCTCTCCATTTTGTCAATTGTAAGTACCAACAAGAGATAAGT, TAGCTACGATC
GATATATTATATCGTACGCGTCGATGCTCGTACGATCGCTAGCCCGCGGGGCGGC
```

# Thanks!

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Questions, comments, feedback:

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Our site:

[dna-utah.org](http://dna-utah.org)

