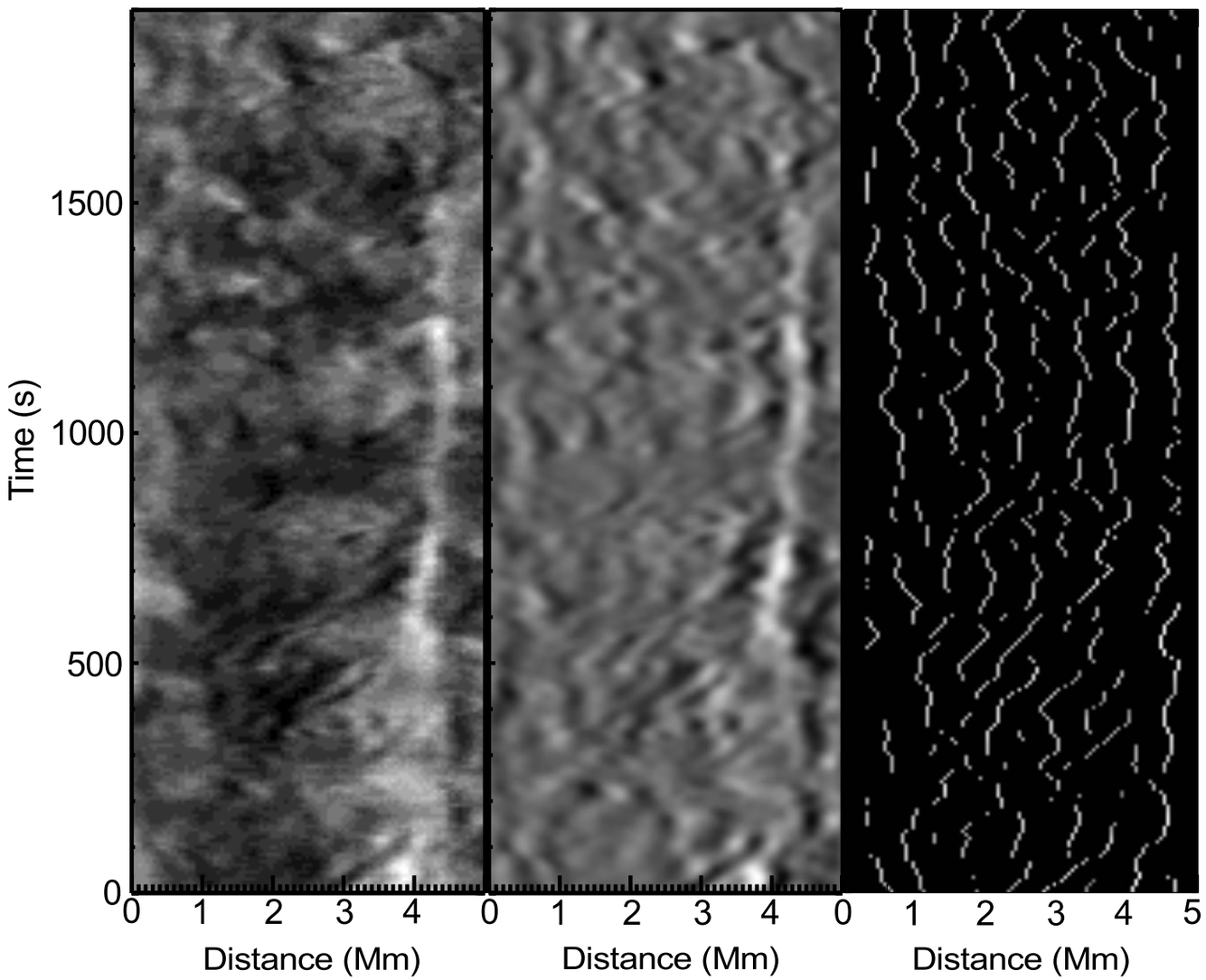
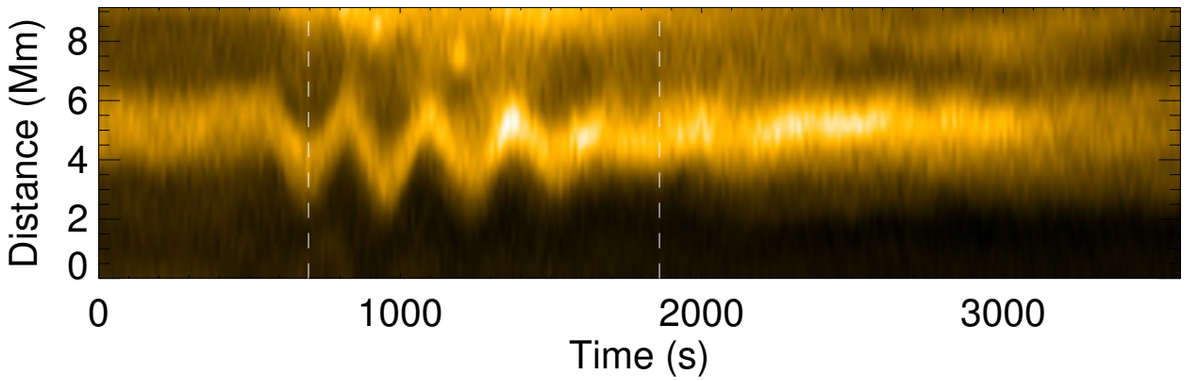
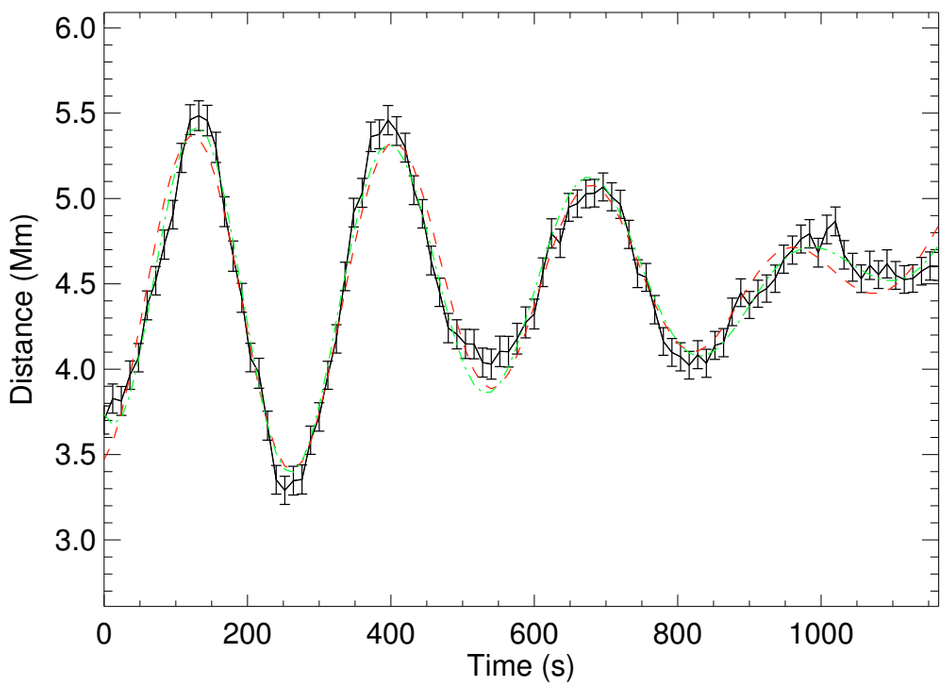
Northumbria University Wave Tracking code NUWT

(pronounced *newt*)







Wave Tracking

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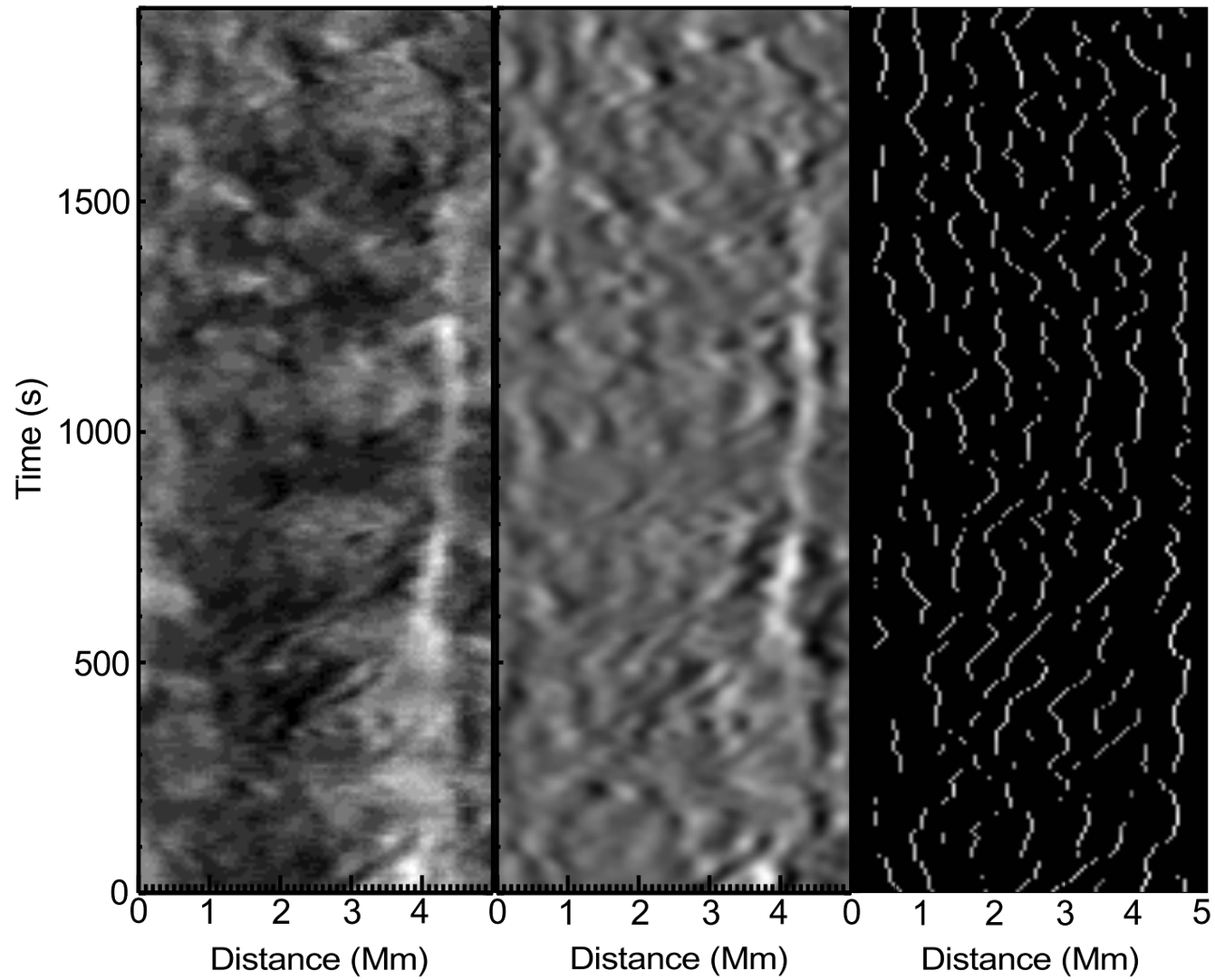

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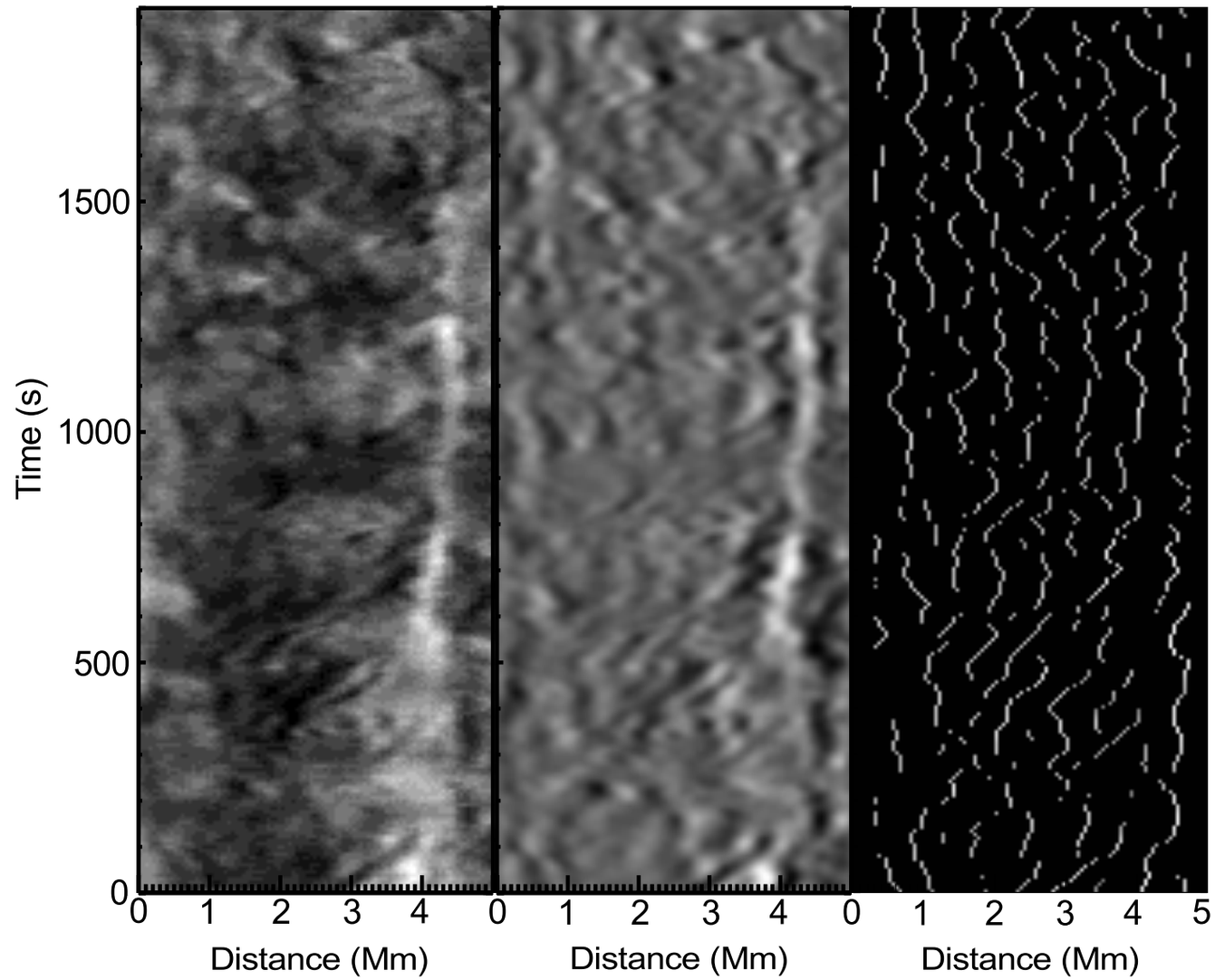


Detailed study of these features will require robust techniques for:

* *Finding features*;
* *Accurate measurement of location*;
* *with potential for automation*.

Feature selection

Feature selection is apparently simple - easy to introduce noise.

Direct cubic interpolation minimises noise.

Three routines for feature selection:

* *diag_slit.pro*
* *wave_track.pro*
* *spline_slit.pro*

First two based on calculation of straight lines to get (x,y) coordinates along line. Cubic interpolation of data using (x,y) points to get time-distance diagrams.

Feature selection

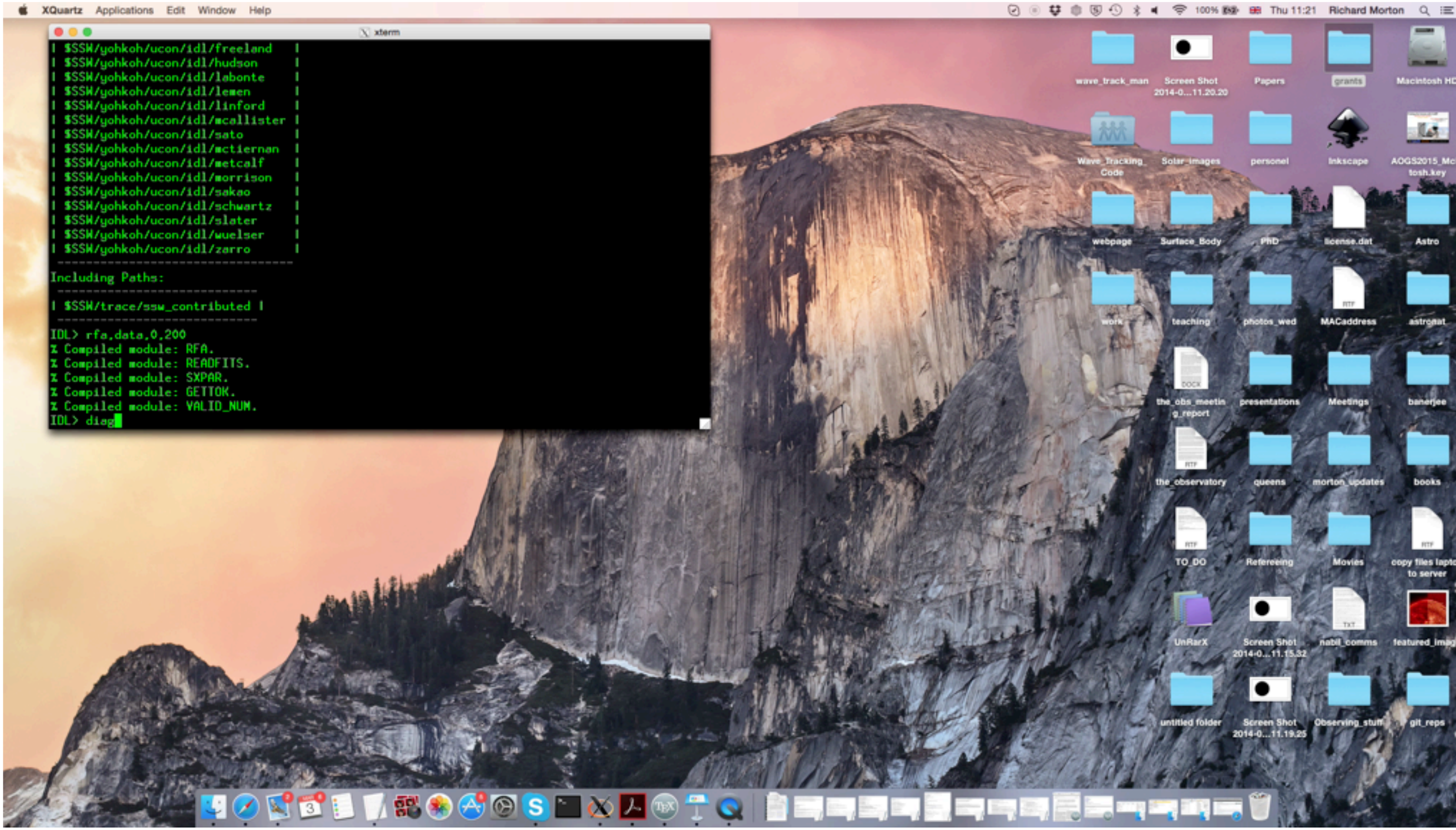
spline_slit.pro

Outline: * Define (x,y) of N of points along feature
* Fit spline through the N points (*spline_p*)
* Calculate normal vectors through spline points
* Calculate cross-cut vectors and interpolate data

Benefit - calculate cross-cuts along a curvilinear feature, e.g., coronal loops.

Other found routines for this have problems, e.g., continued rotation of data with respect to fixed slit position. Introduces substantial noise form interpolation.

Feature selection



ROAS Hα - Fibril selection examples

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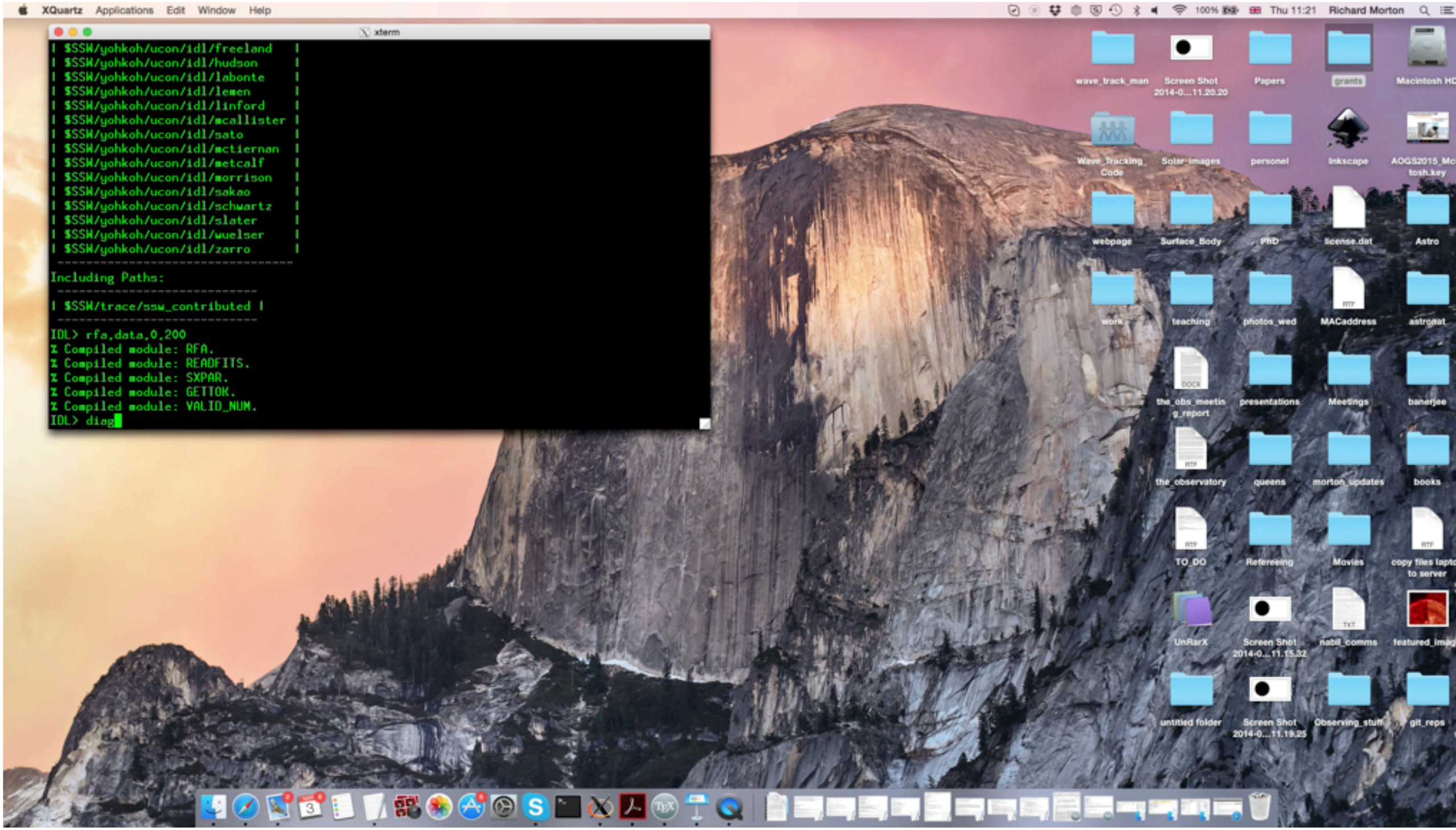

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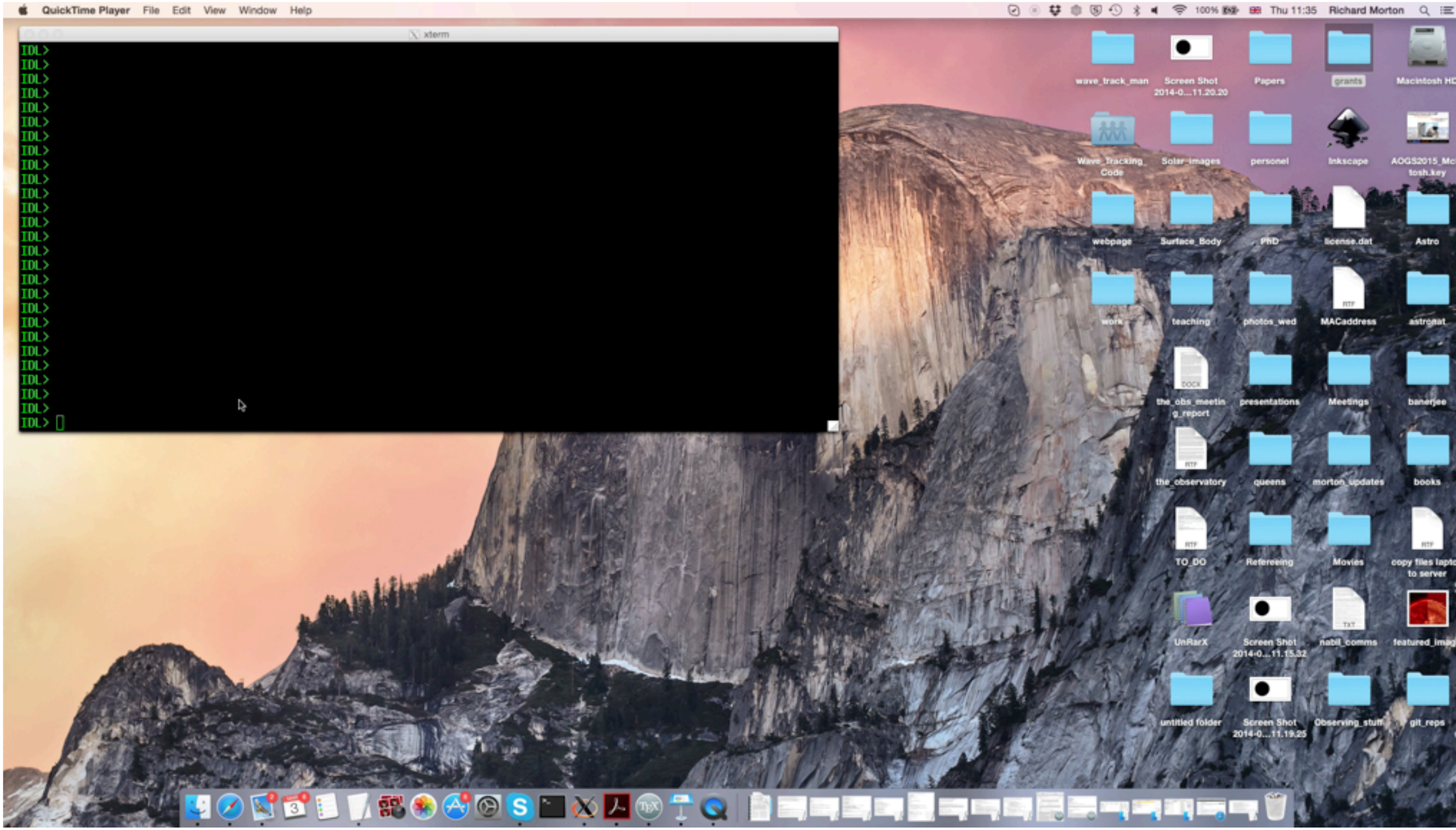

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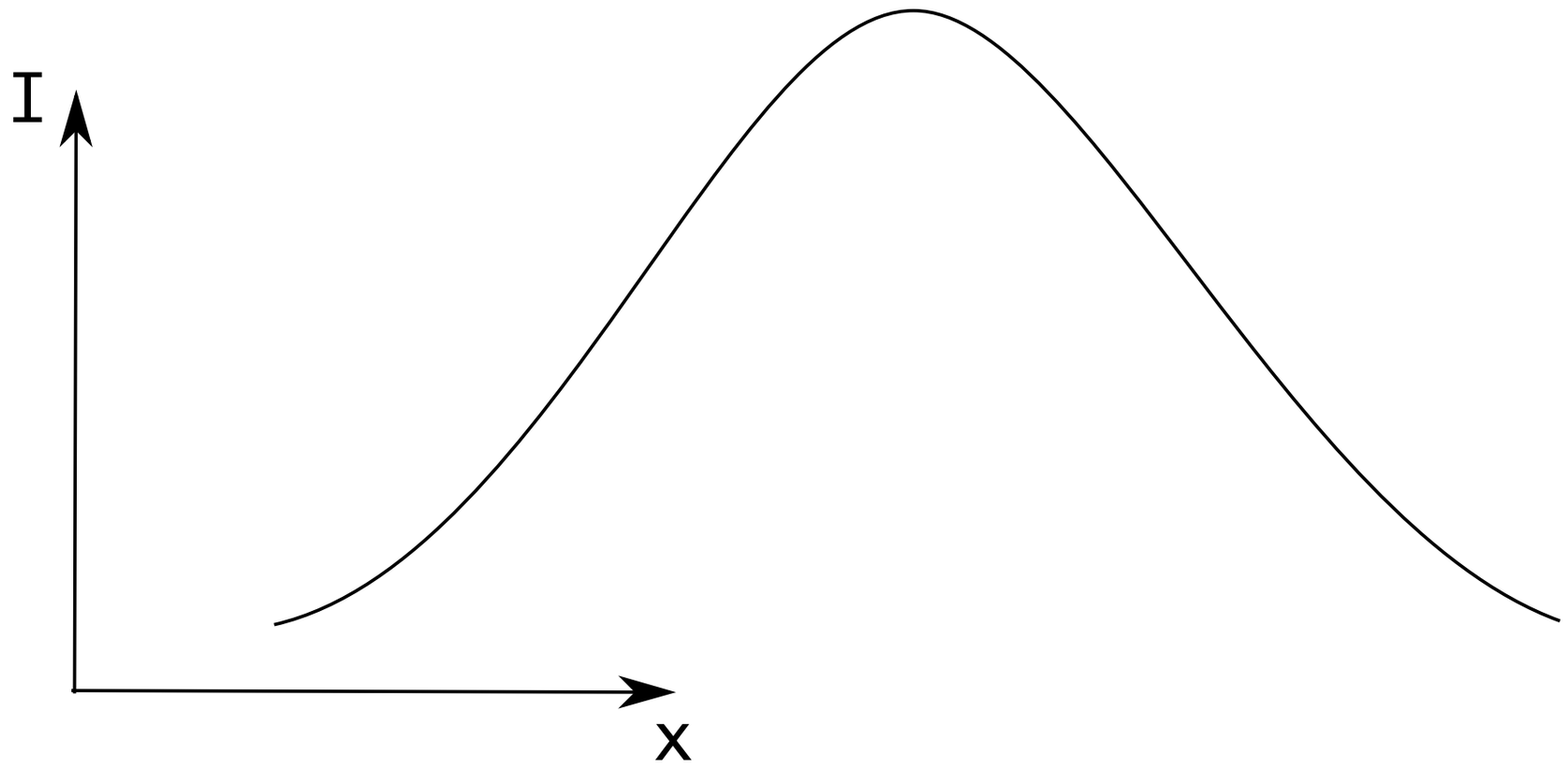

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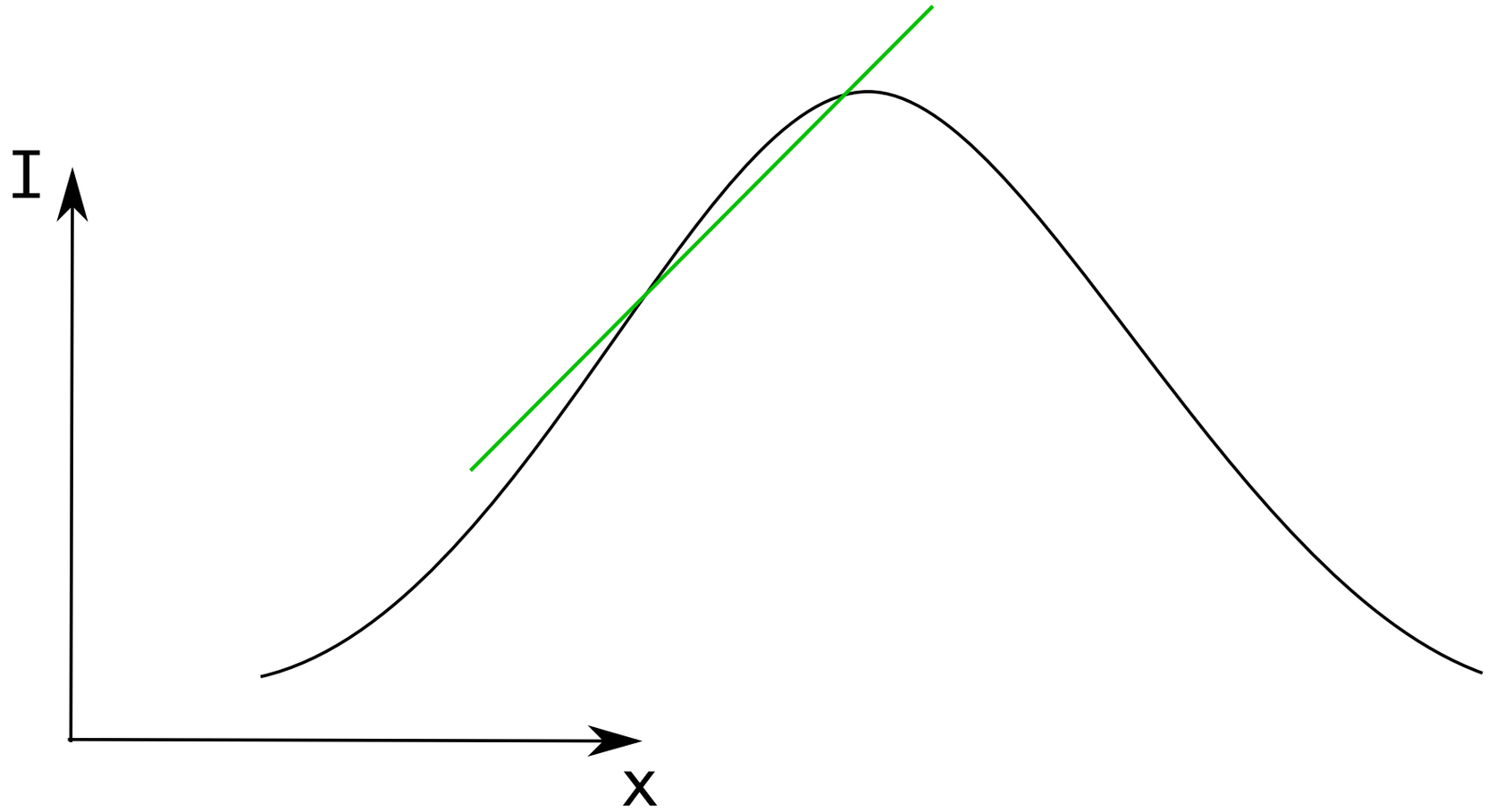

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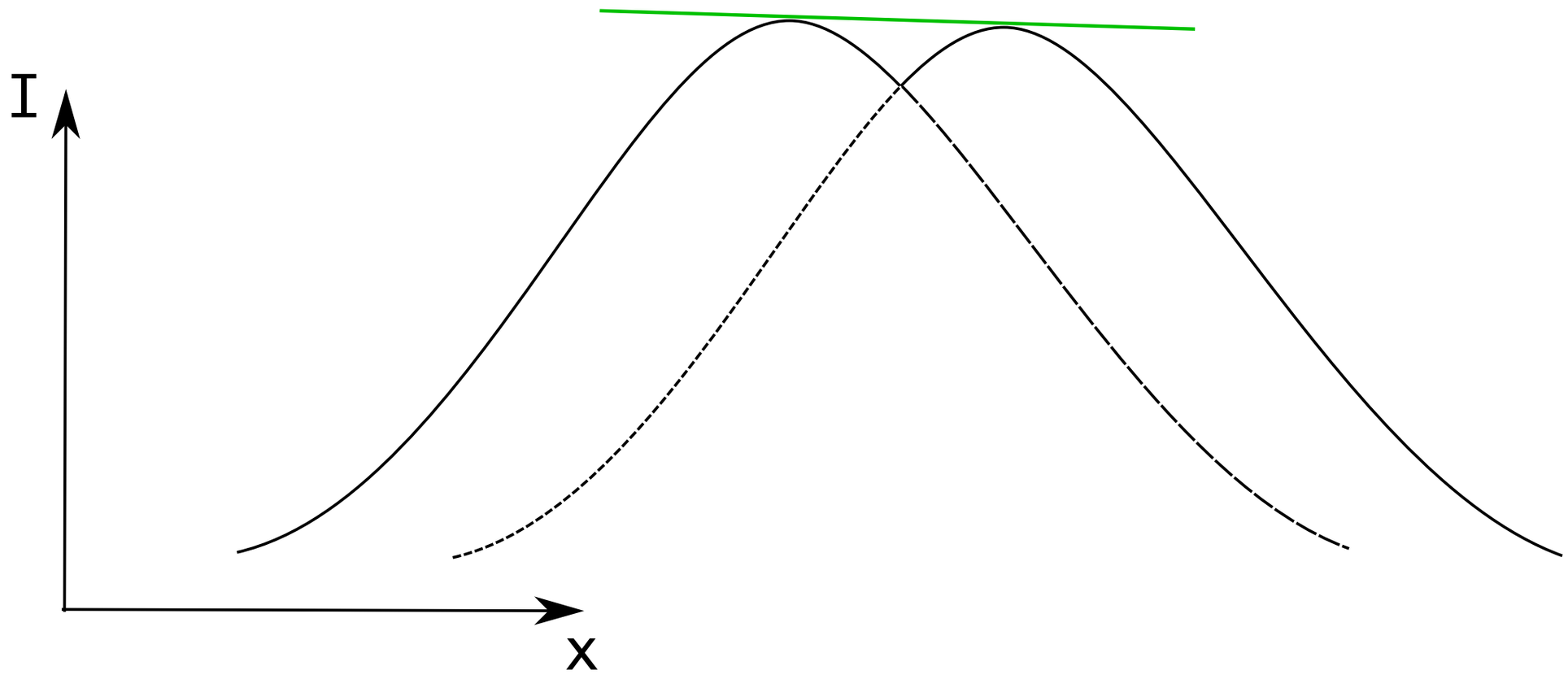

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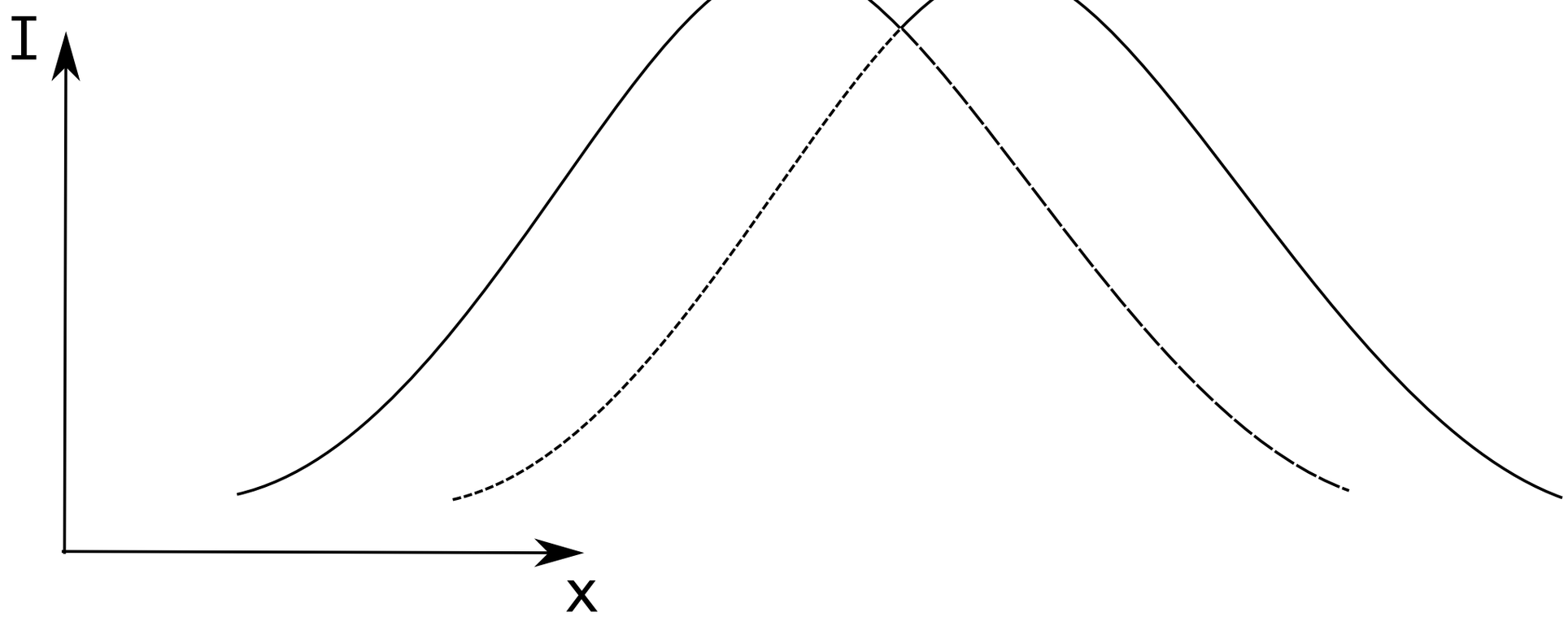

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Two options: * Use whole pixel values of peak position
* Fit Gaussian + straight line to peak - obtain sub-pixel accuracy

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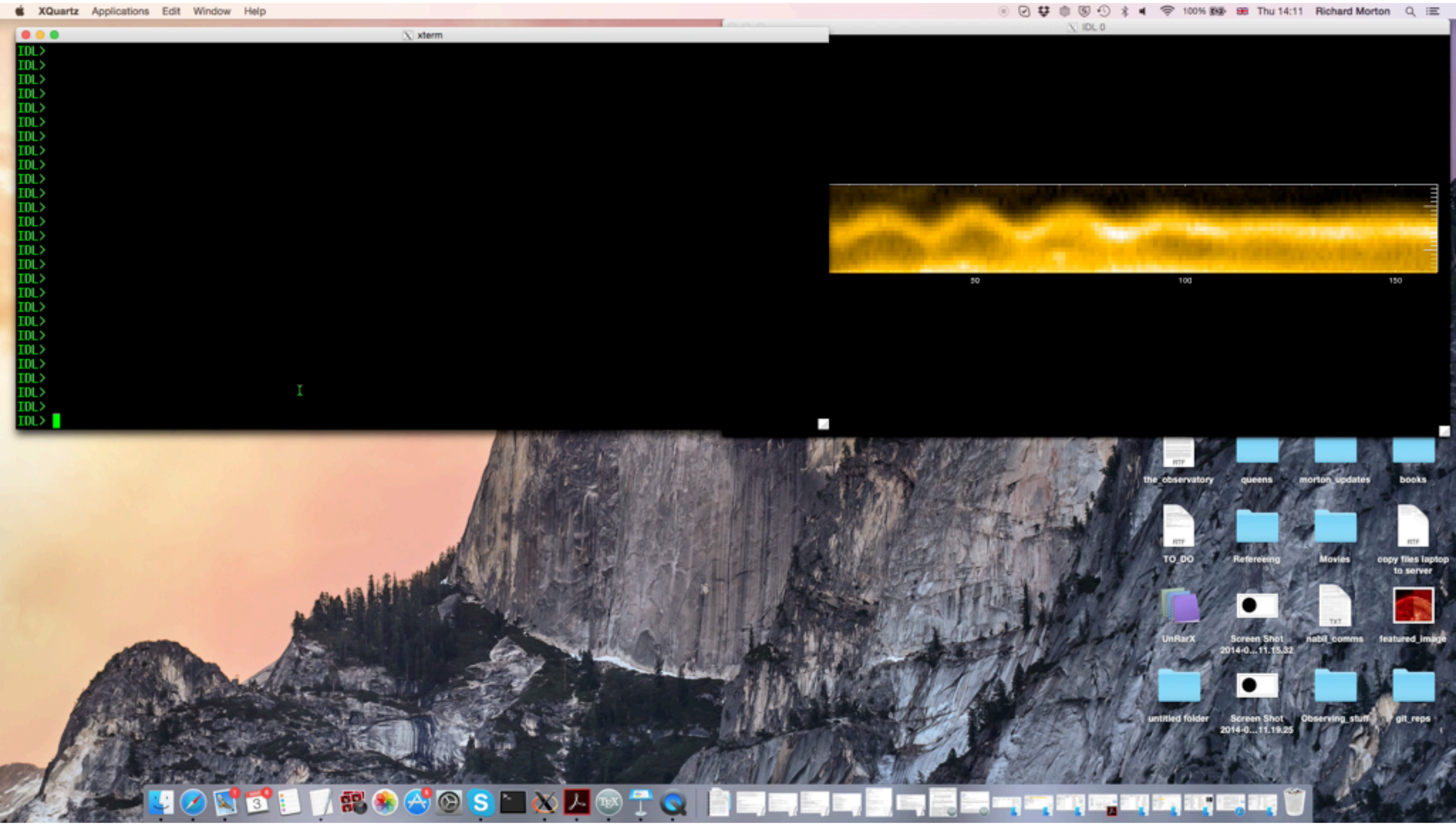

SDO/AIA 171 A - Coronal loop oscillation example

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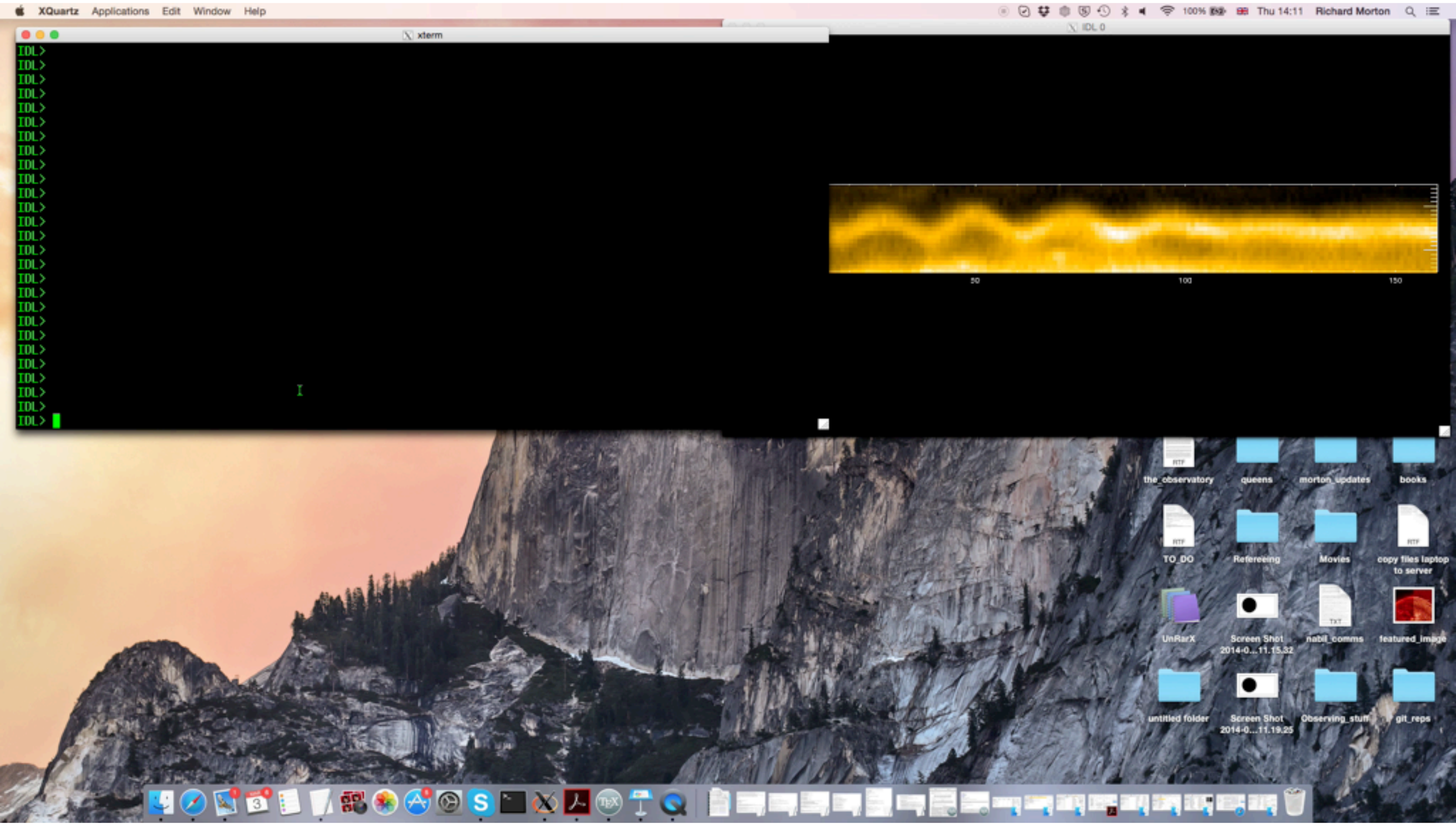

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Semi-automated - still time consuming if performing hundreds of fits. Complete automation of method in progress. - *Hopefully a first version by 2017.*