



# Hamilton Institute

## A Simple and Efficient Natural Sort

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### *Abstract*

I will present (or, rather, cause the audience to derive for me---this is an audience-participation talk) a new sorting algorithm, which has the following properties:

- It is fast:  $O(n \lg n)$  worst case,  $O(n)$  best case;
- It is simple: just a few lines of code;
- It is a "natural" sort: it exploits pre-existing order in the data;
- It is parsimonious of memory. Assuming mutable linked lists, the linked-list variant runs in-place, allocating no list cells at all. Both the destructive/in-place and pure variants require at most a logarithmic number of stack frames;
- It has variants for both vectors and linked lists;
- It is interesting: the algorithm's control is governed by an unusual combination loop/recursion pattern.
- It is flexible: the core of the algorithm yields a general "online tree fold" operator that can be applied in other contexts beyond sorting.

### *Biography*

Prof Shivers did seminal work on higher-order flow analysis, has worked in a wide variety of areas within computer systems, wrote scsh (the Scheme Shell), organised the ICFP 1998 Functional Programming contest, was program chair of ICFP 2003, and continues to put the FUN into Functional Programming.

**Venue:** Seminar Room, Hamilton Institute, Rye Hall,  
NUI Maynooth

**Time:** 1.00 - 2.00pm (followed by tea/coffee)

Travel directions are available at [www.hamilton.ie](http://www.hamilton.ie)