



## wEMBOSS: a web interface for EMBOSS

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### ABSTRACT

**Summary:** wEMBOSS provides a web environment from which the user can access EMBOSS in a user-friendly way. wEMBOSS supplies each user with space and tools to organize and review his or her work.

**Availability:** wEMBOSS can be downloaded at <http://www.wembooss.org>

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### INTRODUCTION

wEMBOSS is a simple and powerful interface which can be installed in 5 min. EMBOSS programs are (Rice *et al.*, 2000; <http://www.emboss.org>) typically accessed from the command line or console. wEMBOSS provides a user-friendly way to access all EMBOSS programs, with tools that help to organize work and review it later.

To serve wEMBOSS, a working EMBOSS installation, a web server, a C compiler, Perl and some modules are needed. Most of these things come bundled in any Linux distribution, so for most users wEMBOSS is an out-of-the-box solution. wEMBOSS can be installed on any Unix system.

To use wEMBOSS only a web browser is needed.

wEMBOSS is an Open Source software released under the GPL license as well as EMBOSS.

### WORKING WITH wEMBOSS

The interface is organized into four different areas. The project selector is located at the top; at the left is the EMBOSS programs menu, below is a box to search for programs, and user data and results are positioned centrally (Fig. 1).

### Projects

wEMBOSS organizes work into projects. Users can create as many projects as they want, and even subprojects within each project; they can also rename and move projects to different locations. This allows work to be logically organized facilitating the review of all project related data.

### Data management

Many functions are provided to manage files in the project. Data can be incorporated into the project by creating a new file, by uploading a file from a local computer or by retrieving data from the databases available in the local EMBOSS installation.

Once the data are in the project, they can be seen using the view function, edited to modify the contents, deleted or copied to another project.

Two special sequence lists; *protList* and *nuList*, are created in each project to include user or database sequence names to be used as an input allowing quick access to these sequences from any program. *protList* and *nuList* are only shown for programs that require protein or nucleotide sequences as input, respectively. Users can also filter the data by some matching criteria.

### Results

When running a program, the results are saved under the current project with the indication of the name of the executed program and the exact date and time it was run. The interface also allows users to copy a given file from the results to the active or another project capable of using these data as input.

### EMBOSS PROGRAMS

EMBOSS programs are presented in a drop-down menu, arranged in an alphabetical order by groups or by program name. If a new program is added to EMBOSS, wEMBOSS includes the program in the menu automatically.

A wEMBOSS administrator can prevent users from accessing certain programs that are not either suited for web access (a program with X-Window output only) or to be run by regular users (an indexation program for system-wide databases).

### Getting help

Programs can be searched using keywords. Matching programs are presented in a new window with the option to run them or look at their online manual, which can also be accessed from the program menu itself.

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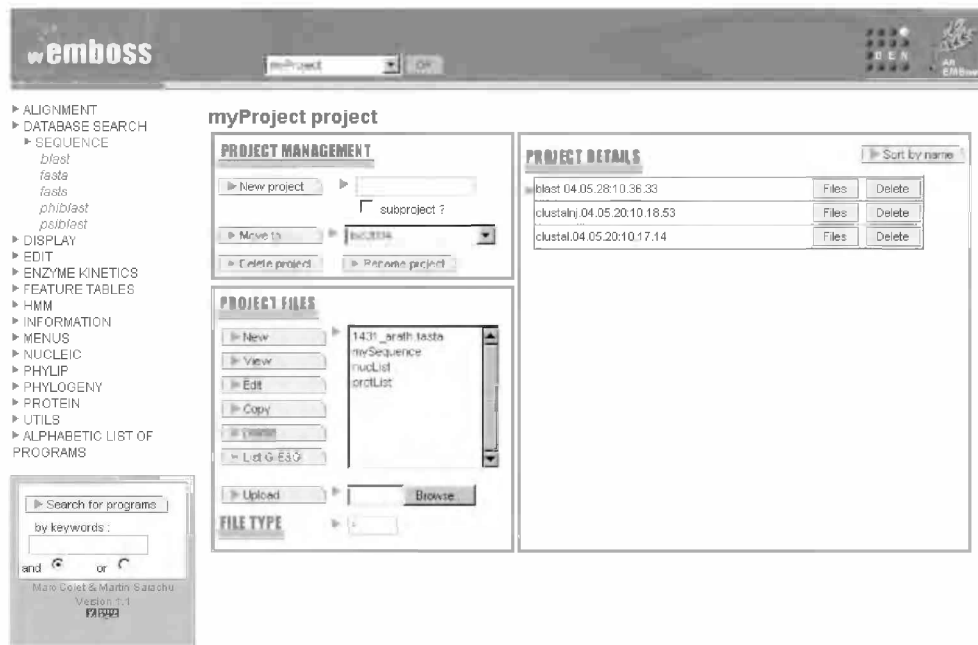


Fig. 1. wEMBOSS main screen: project with user data and results.

## INSIDE wEMBOSS

wEMBOSS is composed of four main components. An authentication program (catch), a JavaScript library (EMBOSS.js) for client side processing, the parsing module (ACD.pm) and the presentation module (wEMBOSS.pm).

### Authentication

To access wEMBOSS each user must be a valid user in the server system. The catch program checks whether the user exists on the system by calling standard system functions. Validation is performed every time the user interacts with the server side of wEMBOSS, although the user password is required only once by the web browser.

### Client side processing

Some minor verifications like name validations are performed by the client browser to avoid contacting the server continuously. A JavaScript library is provided for this purpose.

### Parsing ACD

All EMBOSS programs require an ACD file. This file specifies the input, output and parameters needed for the program. It can also specify dependence among some parameters. The HTML page used to present an EMBOSS program interface is generated on the fly after parsing the EMBOSS ACD file associated with the program. All the ACD expressions are translated into Perl language expressions and evaluated during the execution of the CGI script that generates the HTML page. It makes HTML program pages truly dynamic, for instance, selecting a protein sequence for an alignment

program makes only a choice between the available amino acid substitution score matrices.

### Presentation

wEMBOSS.pm is the heart of wEMBOSS, and is responsible for implementing all the functions users can do. It displays the main window of the interface with the contents of the active project and the programs menu. When user selects a program to run, wEMBOSS.pm will call ACD.pm to parse the ACD file for the program, then it will generate and display a HTML page for the menu. When user submits the job, it will generate a new result in the current project, which is shown in a new window.

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