

# Chapter 1 Introduction

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## Chapter Overview

This introduction provides an overview of the capabilities and features of NCSA Mesher. The organization and use of this manual are described and notational conventions are explained.

## What is NCSA Mesher?

NCSA Mesher is designed to be a preprocessor for computational programs requiring a gridded space. The process of running a simulation in computational science has three steps:

- setting up the problem parameters
- running the computation
- analyzing the results of the computation

NCSA Mesher aids you in the first step of the process by setting up the problem parameters. NCSA Mesher allows you to visually design the problem by creating a grid, defining the attribute data, and assigning the attribute data to specific cells in the grid.

NCSA Mesher is designed to be a general tool, useful across many scientific disciplines. Each scientific discipline has its own unique set of attribute data types. These can vary greatly from discipline to discipline, and can also vary between computational codes within the same discipline. Therefore, a utility program called DBuilder is included with NCSA Mesher. DBuilder provides a mechanism to create a set of dialog boxes that contain your own unique data types. These dialogs are then used within the NCSA Mesher program for data input. It is there that you actually enter real values for your specific problem.

Once the problem has been completely defined, you can export that data to an ASCII file or an HDF VSet file. This exported file is read into the computational program to process the simulation.

NCSA Mesher was designed and created at the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign.

## Special Features

NCSA Mesher allows you to:

- create a cubic, regular or rectilinear grid
- modify the grid (i.e., add new grid planes, delete grid planes, or move grid planes)
- view the computational space in 3D
- rotate the 3D view
- magnify the 3D view
- create attribute data types
- create styles containing data values

- assign styles to specific cells within a grid
- edit data values within a style
- view cells with assigned styles in 3D
- create an ASCII or HDF VSet file containing all the information used by the computational program

## System Requirements

To use NCSA Mesher, you need a Macintosh with 256 color capabilities, at least 2.9 megabytes of RAM, and a monitor.

## Use of This Manual

This section describes the scope and organization of this manual, and the conventions and nomenclature used in developing it.

Before using NCSA Mesher, you should know how to use the mouse, issue commands from menus, work with windows, and locate files using directory dialog boxes. If you have not used the Macintosh before or need more information regarding these procedures, you may wish to refer to the *Macintosh User's Guide* before using this package.

## Manual Contents

This manual is organized into the following chapters:

Chapter 1, *Introduction*, describes the basic features and organization of NCSA Mesher and DBuilder;

Chapter 2, *Menus*, discusses the features and tools available in the menus of the program;

Chapter 3, *3D View*, describes in detail the tools available in the 3D view, including rotation, magnification, and grid manipulation;

Chapter 4, *DBuilder*, is a detailed description of how DBuilder works; and

Chapter 5, *Data Assignment*, is a description of the data assignment process for data types previously defined using the DBuilder application.

## Installing NCSA Mesher

As you would for any new Macintosh software, create a new folder and copy the contents of the NCSA Mesher disk to your hard disk. Once it is on your hard disk, run the file entitled *UnStuffit 1.5* to decompress the application.

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## Getting Started

This section outlines the steps you need to follow to begin running NCSA Mesher and for performing some basic program operations.

### Running NCSA Mesher

To invoke NCSA Mesher, double-click on the NCSA Mesher application icon (Figure 1.1).

**Figure 1.1 NCSA Mesher Program Icon**



NCSA Mesher

### Running NCSA DBuilder

To invoke NCSA DBuilder, double-click on the NCSA DBuilder application icon (Figure 1.2).

**Figure 1.2 NCSA DBuilder Program Icon**



NCSA DBuilder