

# An Introduction to MCNP

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# Chapter 1

## Introduction

Why did I write this book? The manual sucks.

### 1.1 Forewarning

First, reader be forewarned, the contents herein pertain to MCNP6. Since MCNP6 was based directly on MCNP5 (and hence earlier versions), many of the same concepts can be drag-and-dropped verbatim. However, there are some differences between the two. MCNP6 was a merger between the standard at the time, MCNP5 and MCNPX.

¡Purpose of 5/X¡

Every version of MCNP comes with a comprehensive manual with the code itself.

### 1.2 Obtaining MCNP6

Go to the RSICC.

### 1.3 Outline

The structure of this book is built to suit an undergraduate understanding of MCNP6. The emphasis herein is not on the theory and mathematics, though they will be mentioned when they are applicable, but rather on the mechanical operation of MCNP6 as a computational tool to perform analysis. The following chapter will provide a quick summary of the entire book, mapping out the structure of an MCNP6 file as well as the core components needed. Subsequent chapters will focus on a single element of the input file at a time.

### 1.4 Formatting

This is my book. It will occasionally have comments about giraffes. Because they're fucking awesome.

## 1.5 Logistics

Uh, yeah, there might be some.

## Chapter 2

# A Crash Course

I suspect that some readers require more of an immediate start as opposed to an in depth documentary on the intricacies of each and every option MCNP6 has to offer. They are more interesting in running a simple problem or modifying an existing input file to perform some additional calculation.

This chapter will do two things; first it will go over the overall structure of a MCNP6 input, second, it will provide a single-chapter crash course on running an input file for those that simple need to run a file.





## Chapter 3

# Surfaces

They are smooth. Usually. Use pen and paper!

### Problems

1. squid.
2. dog.
3. Create a surface.



## Chapter 4

# Simple Cells

Math for the win.



## Chapter 5

# Repeated Structures

Yeah, they repeat.

### 5.1 Like X But Y

This is like that, but... well, not.

### 5.2 Lattices

They suck a lot. Yeah, a whole lot.

### 5.3 Universes

They go inside themselves.



## Chapter 6

# Materials

Like copper, iron, and cotton candy.

### 6.1 Cross Section Libraries

They have data. Making your own custom libraries.





## Chapter 7

# Source Definitions

This is going to be a really long chapter

### 7.1 Point Sources

They are simple

### 7.2 Energy Distributions

There are quite a few types of them

### 7.3 Beam and Cone Sources

Pencil beams, and cones for ice cream.

### 7.4 Volume Sources

Lots of them!



## Chapter 8

# Tallies

These are useful.

### 8.1 Surface Tallies

Across the surface, ho!

### 8.2 Volume Tallies

Through the volume, ho!

### 8.3 Point Detectors

They are magical and perfect.

### 8.4 Mesh Tallies

They're all meshy.

### 8.5 Modeling real detectors

It's hard. I quit.



## Chapter 9

# Visualizing

If you're blind, just skip this chapter.

### 9.1 MCNP Plotter

It sucks.

### 9.2 VisEd

It's not quite as bad as the plotter, but it still sucks. A lot.



## Chapter 10

# Postprocessign Data

Like Matlab?





# Chapter 11

# Theory

You're reading the wrong book. Sorry buddy.