Overview of UCSF Chimera

Spoken Tutorial Project
http://spoken-tutorial.org
National Mission on Education through ICT
http://sakshat.ac.in

Snehalatha Kaliappan
IIT Bombay

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Learning Objectives

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- **About UCSF Chimera**

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- **Download and installation on Ubuntu Linux OS**

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- **Uses and Advantages**

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- **Play video clippings of Chimera available on our website**

System Requirement

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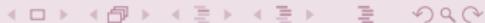- **UCSF Chimera version 1.13**
- **Mozilla Firefox browser version 54.0**

System Requirement

- Ubuntu Linux OS version 14.04
- UCSF Chimera version 1.13
- Mozilla Firefox browser version 54.0
- Working internet connection

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- **Developed by the Resource for Biocomputing, Visualization, and Informatics (RBVI), University of California, San Francisco (UCSF)**

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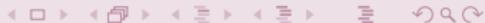
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- **It can be downloaded free of charge for academic, government, nonprofit and personal use**
- **Runs on Windows, Mac OSX and Linux OS**

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- **http://www.cgl.ucsf.edu/chimera/**

Advantages of Chimera

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- **Visualize molecular data on all scales, including large molecular assemblies**

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- **Designed to accommodate outside development of software extensions**

Video Clippings

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- **UCSF Chimera Spoken Tutorials**

Spoken Tutorial: Structure Manipulation

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- ▶ **Open a structure on the Chimera window**
- ▶ **Move, rotate and zoom the structure**
- ▶ **Scale and clip**
- ▶ **Change the display**

Spoken Tutorial: Picking and Selection

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- **Show labels for atoms and residues**
- **Select atoms and residues using Select menu or by Picking**
- **Change the color and display of the residues**
- **Add, delete or change atoms, rotate bonds**

Spoken Tutorial: Writing commands

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- Change the display to atoms
- Show and hide ribbons
- Change the color of the amino acid residues
- Label individual residues

Spoken Tutorial: Surface Properties

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- **Show surfaces for protein and DNA structures.**

- **Create images of protein surface colored by:**
  Amino acid hydrophobicity
  Electrostatic Potential

Spoken Tutorial: Build Structures

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- **Create structures of small molecules, peptides and DNA fragments**
- **Modify structure, minimize energy and join models**

Spoken Tutorial: Stucture Analysis

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- **Measure distance between atoms in the structure**
- **Show Hydrogen bonds**
- **Identify non-polar interactions**
- **Rotate bonds in the residues to get different rotamers**

Spoken Tutorial: Superimposing and Morphing

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- **Superimpose and compare different structures of the same protein**
- **Morph conformations and create a trajectory**

Spoken Tutorial: Attributes

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- **Change attributes of atoms, residues and models**
- **Color atoms in a protein according to B-factor values**
- **Color residues according to kdHydrophobicity values**

Spoken Tutorial: Animation

- ▶ **Adjust background lighting and effects**
- ▶ **Create scenes for animation**
- ▶ **Place scenes along a timeline**
- ▶ **Record a movie of the resulting animation**

Axes and Planes

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- **Show Axes, Planes and Centroids for structure of Green Fluorescent Protein**
- **Show 2D-Labels**
- **Draw Arrows**
- **Clip a model of Myoglobin using Per-Model clipping tool**

Summary

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Assignment

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- **Install Chimera on your PC**
- **Explore Chimera interface**

About the Spoken Tutorial Project

- Watch the video available at http://spoken-tutorial.org /What_is_a_Spoken_Tutorial

- It summarises the Spoken Tutorial project

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Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- ▶ **Conducts workshops using spoken tutorials**

- ▶ **Gives certificates to those who pass an online test**

- ▶ **For more details, please write to contact@spoken-tutorial.org**

Forum for specific questions

- **Do you have questions in THIS Spoken Tutorial?**
- **Please visit**

  http://forums.spoken-tutorial.org
- **Choose the minute and second where you have the question**
- **Explain your question briefly**
- **Someone from our team will answer them**

Forum for specific questions

- **The Spoken Tutorial forum is for specific questions on this tutorial**
- **Please do not post unrelated and general questions on them**
- **This will help reduce the clutter**
- **With less clutter, we can use this discussion as instructional material**

Acknowledgements

- **Spoken Tutorial Project is a part of the Talk to a Teacher project**
- **It is supported by the National Mission on Education through ICT, MHRD, Government of India**
- **More information on this Mission is available at http://spoken-tutorial.org /NMEICT-Intro**