STIR

Software for Tomographic Image Reconstruction

http://stir.sourceforge.net

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Topics

- Overview

- Current status & User survey (Feb 2012)

- STIR and SimSET

- STIR and Python

STIR

STIR objectives

- Software for image reconstruction and data manipulation (STIR 2.2 only PET, but see next presentation!)

- Research enabler

- Portable to any system with a capable C++ compiler
  – GNU C++, MS Visual Studio, Clang, Intel C++
  – Linux, Windows, MacOS, Solaris, ...

- Open Source License: (L)GPL

Main Features:

- **Open source library, designed for team-development**
  - Object-oriented (C++), modular, automatic testing
  - Documentation: overview documents; code-specific (doxygen)
- **Capabilities**
  - Analytic and iterative 3D reconstruction algorithms: FBP-3DRP, SSRB, FORE, OSEM, OS-MAP-OSL (including MRP), OSSPS (including QPR), list-mode EM and SPS
  - Parallel processing using MPI
  - Various utilities (e.g. attenuation & scatter correction, image/sinogram data manipulation, ROI parameters estimation, ...)
  - Pharmacokinetic modelling classes for direct parametric reconstruction
  - Data formats: Interfile, ECAT Matrix and partially GE VOLPET

ST!R

Active users & developers

- Three open public mailing lists:
  Announcements (208 members),
 Users (242 members),
  Developers (77 members)

156 STIR-users Publications
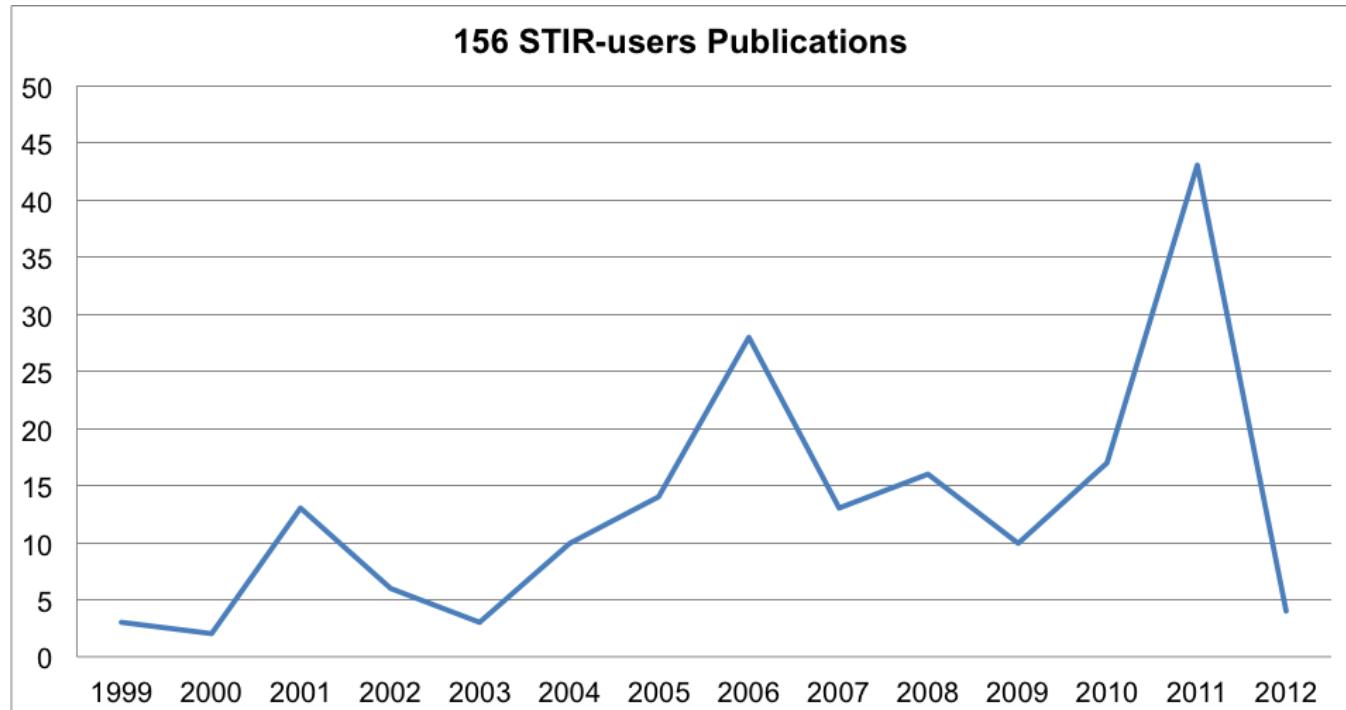
STIR

STIR Users' Survey 2012

49 responses representing 67 active users

Simulation package used

- SimSET 28%
- GATE 49%
- Simind 12%
- PeneloPET 1%
- SORTEO 2%
- ASIM 4%
- EGS4 1%
- Own 1%
- None 2%
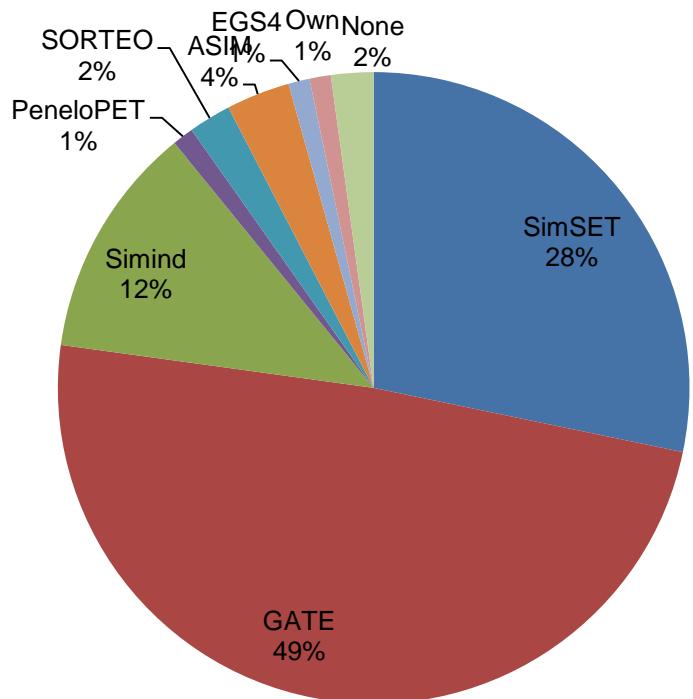
Which modality would you like to be added to STIR?

- SPECT 37%
- CT 26%
- MRI 21%
- Optical 6%
- None 10%
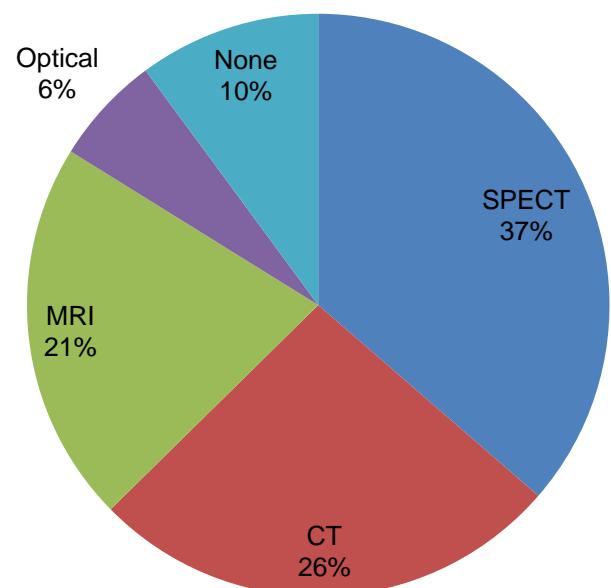
User Interest in new features
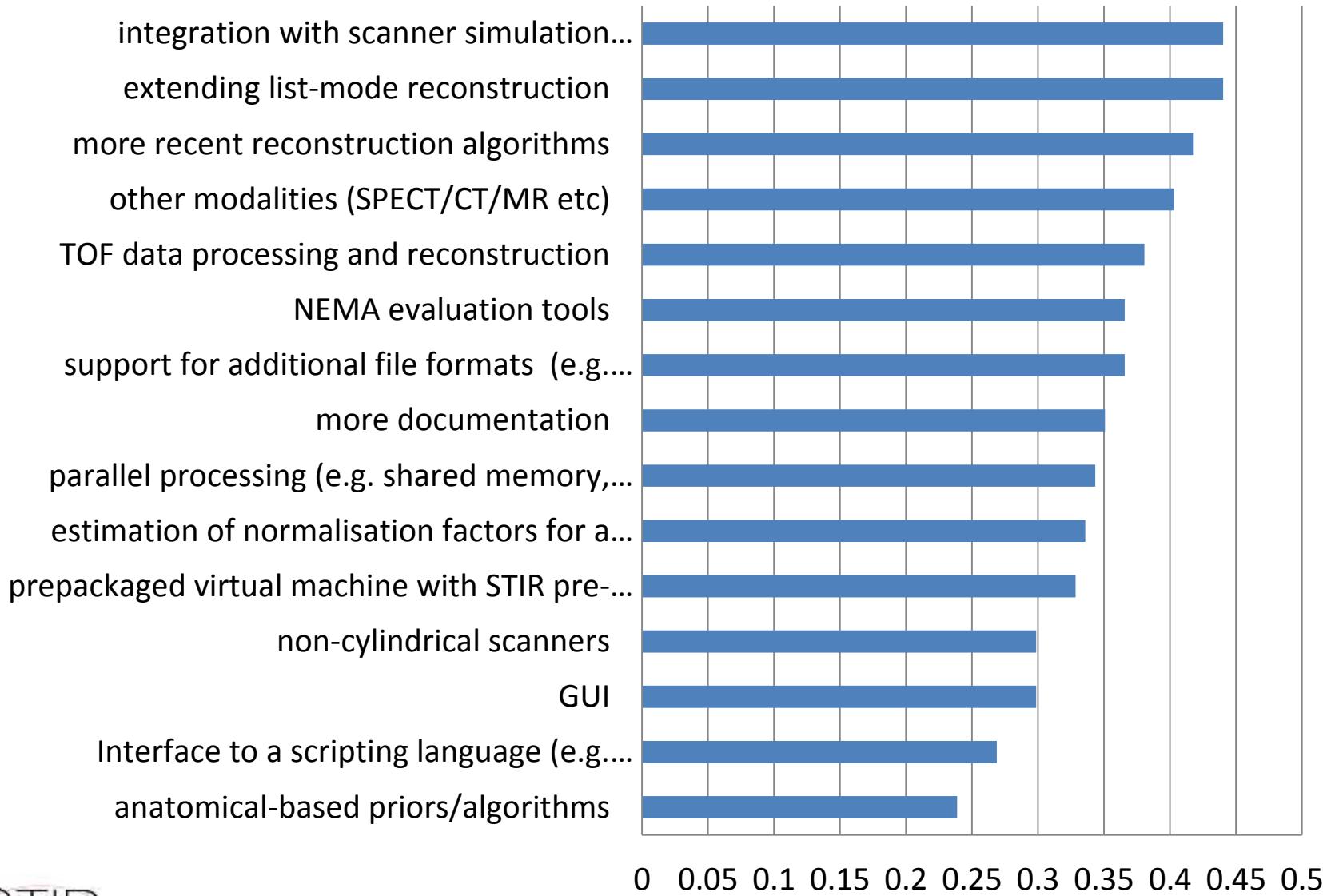
Using SimSET and STIR 2.2

- Data conversion routines
  - SimSET sinograms and images to Interfile
  - Interfile images to binary data for SimSET
- Scripts (bash, python)
  - Assist with conversion
  - run_SimSET.sh (converts Interfile data to SimSET images, adapts phg templates, runs SimSET, converts sinograms)
- Limitations
  - Cylindrical scanners
  - SimSET sinograms (odd number of tangential positions)

STIR-SimSET live demo
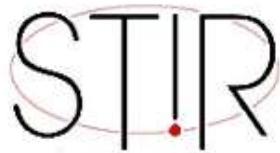
STIR and Python

- ## What is Python ?
    - Open Source scripting language, popular for scientific work (and other things!)
    - Many many extensions
        - Numpy, scipy, matplotlib, Mayavi
        - Qt, VTK, ITK ….

- ## Interface to STIR built using SWIG
    - Groundwork for using Java, Octave, R, C#,…

STIR-Python live demo

More information

Main publication:

Thielemans, Tsoumpas, *et al* (2012) STIR: Software for Tomographic Image Reconstruction Release 2, *Physics in Medicine and Biology*, 57(4):867-83.

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