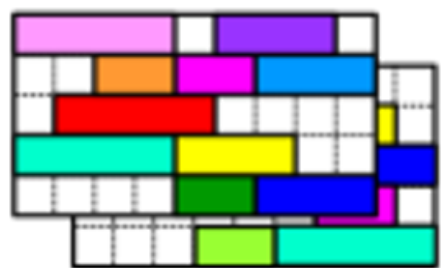




Credit: Photo by Loïc Romer

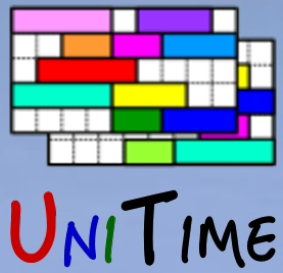


UNI^{TIME}

UniTime: State of the Project

Tomáš Müller





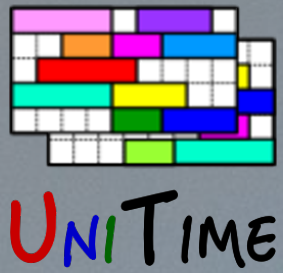
Agenda

Agenda

- Short introduction of UniTime
- State of the Project
- UniTime 4.2 (Current Version)
- UniTime 4.3 (New Version, to be released in June 2018)
- Plans for next release & long term



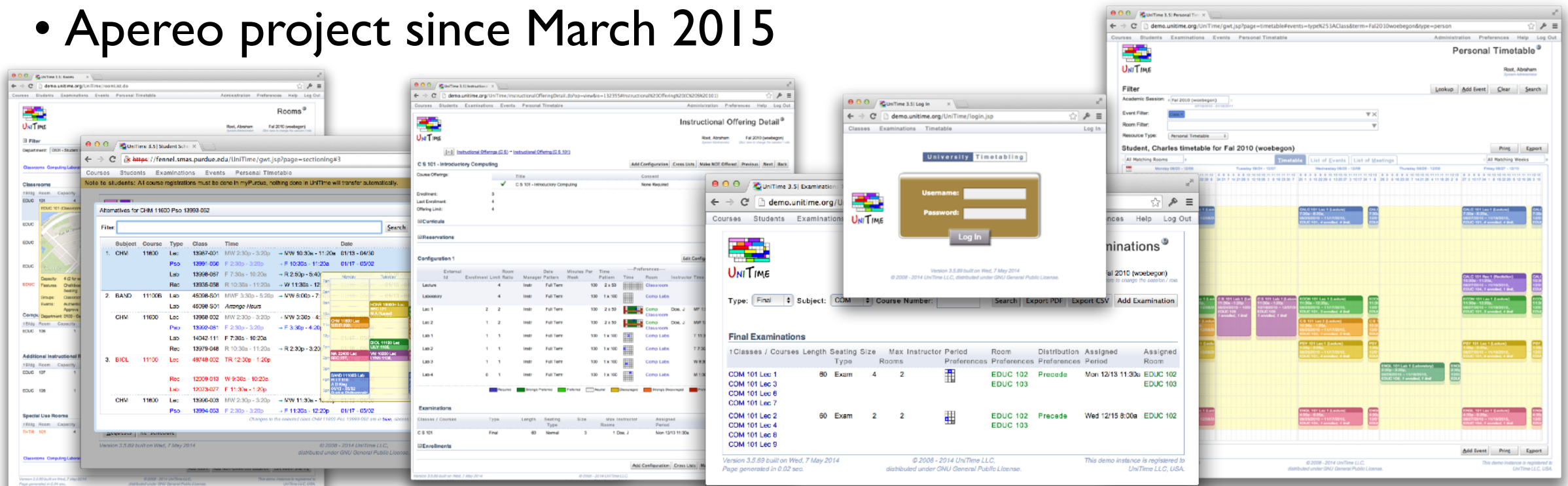
This presentation is available at www.unitime.org/present/apereo18-unitime.pdf

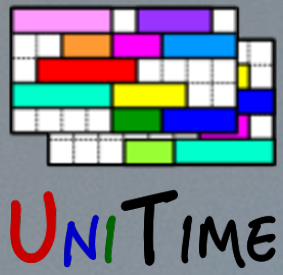


Course Timetabling

What is UniTime?

- Comprehensive academic scheduling solution
- Four components: course timetabling, examination timetabling, student scheduling and event management
- Open source, web-based, written in Java using modern technologies
- Using state-of-the-art optimization algorithms
- Distributed data entry and timetabling in multi-user environments
- Apereo project since March 2015



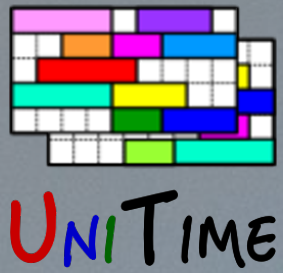


State of the Project

Releases / Achievements

- UniTime 4.2 released in June 2017
 - Instructor Scheduling, Mobile, Student Groups, Point in Time, Event Management
- UniTime 4.3 to be released in June 2018
 - Course Request Validation & Batch Student Scheduling
 - *More to follow in this presentation...*
- UniTime 4.4 specs are being defined
- 55 institutions from 33 countries filled our voluntary registration form during the last 12 months
- 63 institutions indicated that they use UniTime in production
- Steady increase in interest and adoption from literally around the world
 - But still very little outside contributions
- Both sides of the interface with Ellucian Banner are now available





UniTime Users

Word cloud from our voluntary registrations (all of them)



International Timetabling Competition 2019

- To be announced at PATAT 2018 this August (winners at PATAT 2020)
- Course timetabling problem
 - Assignment of classes to times and rooms, students to classes
 - Course structure, classes with available times and rooms, student course demands, distribution constraints
 - Optimization: time and room penalties, (soft) distributions, minimization of student conflicts
- Based on real-life data collected using UniTime
 - Anonymized, a slightly simplified problem model
 - 10+ institutions from around the world
- Organization
 - Looking for best solutions, commercial solvers allowed, no time limit
 - Three groups of data will be published during the competition
 - Competition website with solution validator, best known results, etc.



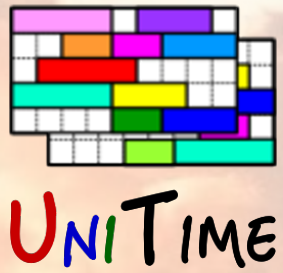
Current Release: UniTime 4.2

UniTime 4.2

- Released June 2017
- Brand new Instructor Scheduling component
 - Automatic assignment of instructors (TAs) to classes
- Mobile-friendly user interface
 - Using responsive design
- Improved ability to keep students of a particular group together
 - Both course timetabling and student scheduling
- Point in time reports
 - E.g., census date limits & enrollment data
- Event Management
 - automatic approval, service providers, meeting contacts
- Many other improvements across the whole application

See <https://goo.gl/4gIXQV> (UniTime 4.2 Release Docs) for more details.





New Release: UniTime 4.3

UniTime 4.3

- To be released in June 2018
- Batch Student Scheduling
 - Custom Course Requests Validation
 - Scheduling Dashboard
- Course Timetabling
 - Solver pages rewritten to GWT
 - Improved localization and internationalization
 - A number of new features and improvements
- Scripting & Reporting
 - API, new parameters, Task Scheduler
- Many other improvements across the whole application

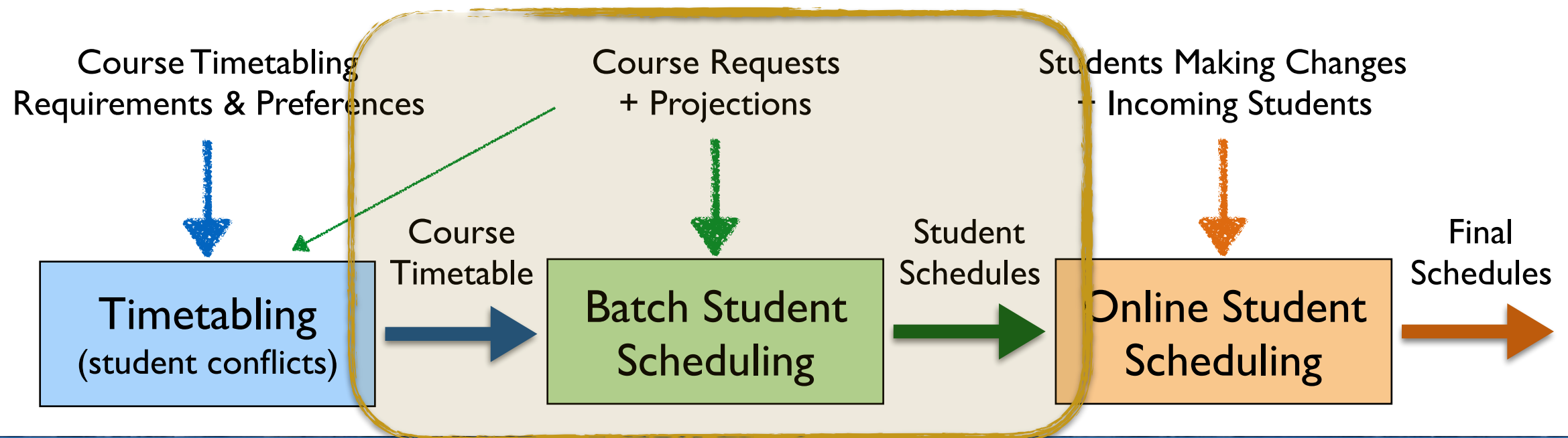
See <https://bit.ly/2lBrbAs> (UniTime 4.3 Release Notes) for more details.



Batch Student Scheduling

Batch Student Scheduling

- After a timetable is produced
- Using pre-registrations and student course demand projections
- To provide students with initial schedules
- An optimization process, using the (student scheduling) solver
- It is possible to iterate
 - With the ability to keep already enrolled students unchanged or to minimize changes



Batch Student Scheduling

Course Requests

- Custom Validation
eligibility, max credit,
overrides
- Status Icons
- Print Confirmation

Course Requests

1. Priority ECE 27000

College Restriction
Prerequisite error. See the Schedule of Classes.

1. Alternative HTM 29101

Field of Study Restriction - Major
Prerequisite error. See the Schedule of Classes.

2. Priority CHM 25500

Prerequisite error. See the Schedule of Classes.

1. Alternative HTM 29102

Field of Study Restriction - Major

3. Priority HTM 23100

Field of Study Restriction - Major
No alternative course provided.
Prerequisite error. See the Schedule of Classes.

1. Alternative Alternative to HTM 23100

4. Priority PSY 63100

Student Level Restriction (UG, PR, GR)
No alternative course provided.
Permission from Department

1. Alternative Alternative to PSY 63100

5. Priority PHYS 25200

No alternative course provided.

Request Overrides

The following registration errors have been detected:

COM 21000 Prerequisite error. See the Schedule of Classes.

HTM 29101 Field of Study Restriction - Major
Prerequisite error. See the Schedule of Classes.

HTM 29102 Field of Study Restriction - Major

If you have already discussed these courses with your advisor and were advised to request registration in them please select Request Overrides & Submit. If you aren't sure, click Cancel and consult with your advisor before coming back to your Course Request page.

Request Overrides & Submit

Cancel

3. Alternate

Degree Plan Current Registration

Total Credit: 14 - 17

Submit Requests

You have made some changes in your course requests. Please click the Submit Requests button to update your submission.

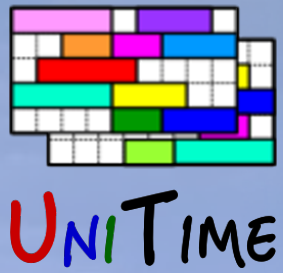


Batch Student Scheduling

Student Scheduling Dashboard

- Advisor access
 - My Students, Change Status, Change Group
- More information
 - Overlaps, Distances
 - Request Credit
 - Alternatives
 - Student Details (requests, grid)
- Student statuses
 - Assistant / Request
 - Effective Dates
 - Fallback Status

[illegible]



Batch Student Scheduling

Student Scheduling Solver

- Custom validation & overrides
- Custom save (e.g., using Banner XE API to enroll students)
- Short distances (for students with accommodation)
- Student group types
 - Keep students together
 - Allow disabled sections (may require a group reservation)
- Custom overrides
 - Ability to request time/space conflict when needed

Code	Name	Keep Students Together	Disabled Sections	Advisors Can Set
Advisor	Advisor Managed Groups	✗	Not Allowed	✓
LC	Learning Communities	✓	Allowed With Group Reservation	✗
MGMT	Management Teams	✓	Not Allowed	✗
STAR	STAR Students	✗	Not Allowed	✗



- Rewritten to GWT
 - Localizable, First day of week
 - Customizations
- New Features
 - Filter on Suggestions page
 - Export to Excel

Credit: Photo by Susan Moss

Reporting

- New parameters for HQL reports
- Report API

Edit Scheduling Assistant Usage [last N days, by hour, selected operations]

Name: Scheduling Assistant Usage [last N days, by hour, selected operations]

Description: This report shows the Student Scheduling Assistant usage during the last N days.

Query:

```
to_char(max(l.apiPostTime,'999,990')) as API_POST,
to_char(avg(l.cpuTime/1000000), '999,990.000') as CPU_Time,
to_char(100.0 * count(case when l.apiGetTime is not null then 1 end) / count(l),'990.0') || '%' as API_GET,
to_char(100.0 * count(case when l.apiPostTime is not null then 1 end) / count(l),'990.0') || '%' as API_POST
from
OnlineSectioningLog l
where
l.session= %SESSION% and l.timeStamp > sysdate - :days and l.operation = :operation
group by to_char(l.timeStamp, 'YYYY/MM/DD-hh24'), l.operation
order by to_char(l.timeStamp, 'YYYY/MM/DD-hh24') desc, avg(l.wallTime) desc, l.operation
```

Flags:

☐ Appearance: Courses

☐ Appearance: Examinations

☒ Appearance: Student Sectioning

☐ Appearance: Events

☐ Appearance: Administration

☐ Restrictions: Administrator Only

Parameters:

Name	Label	Type	Default
days	Number of Days	integer	7
operation	Operation	enum(enroll,section,suggestions,	enroll

Save Test Export Delete Back

Scripts

- Send email when done
- Clustering
- Script API
- New parameter types
(e.g., time, date, or timestamp)
- Automation

Add Task...

Name:

Dates:

May 2018

June 2018

July 2018

August 2018

September 2018

October 2018

November 2018

December 2018

January 2019

February 2019

March 2019

Time:

Script:

Description: Change status of the students that have checked in (returned from Premis, vSTAR_checkin_unitime view) to the selected status (STAR).

Premis Server:

Student Status:

Email: ☐ Send email when finished

Save Back

Scheduled Tasks for Fall 2018 (PWL)

Task Name	Owner	Script	Parameters	Date	Time Status
DRC: Export Rooms	Muller, Tomas	DRC: Export Rooms		Thu 05/17, 2018	6:00a Failed
				Fri 05/18, 2018	6:00a Finished
				Fri 05/25 - 07/27, 2018	6:00a Created
STAR: Update VSTAR Muller, Tomas	STAR: Update VSTAR Student Group: VSTAR - VSTA...			Thu 05/17, 2018	5:00a Failed
				MTF 05/18 - 05/22, 2018	5:00a Finished
				MTWThF 05/23 - 05/31, 2018	5:00a Created

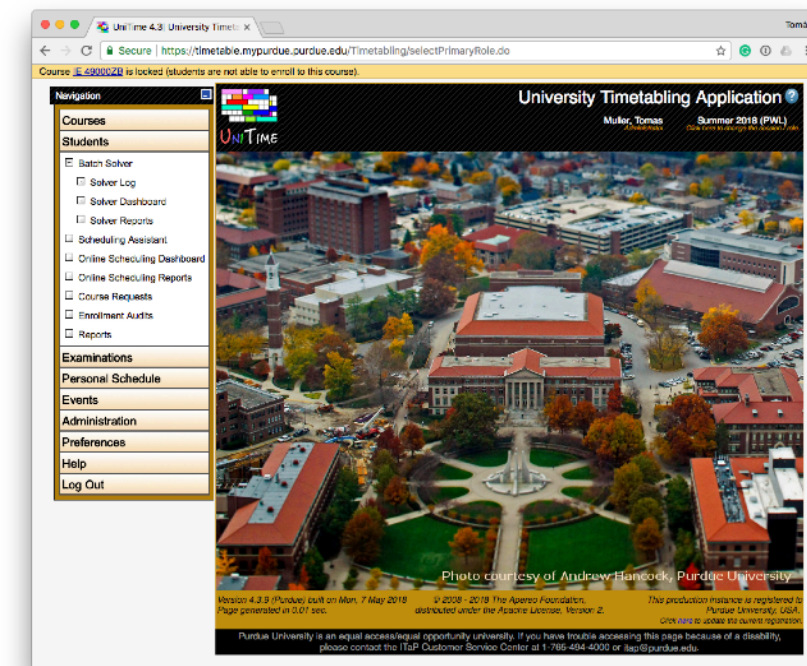
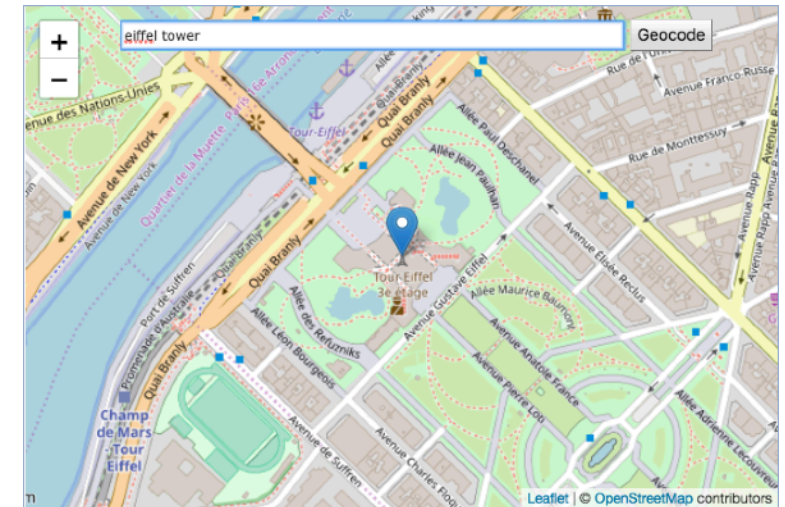
Add New

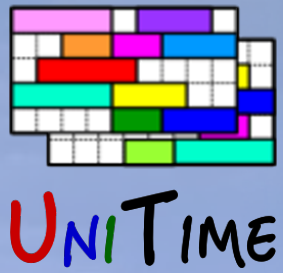
Refresh

Other Improvements

- Added ability to use OpenStreetMap
- Course Offering XML: create if not exists
- Course Requests XML: add / drop requests
- Test HQL: Export CSV, table formatting & pagination
- Instructor API: export instructor preferences
- Room Availability: include events from other academic sessions
- Events: first day of week can be changed
- New manuals (see Help > Manuals)
- Branding (using custom CSS)

...





Next Release: UniTime 4.4

UniTime 4.4

- Planned release: mid 2019
- TBD, most likely student scheduling
 - Ability to request pairs of courses
 - Avoid/minimize online courses
 - Interfaces, student schedule quality / fairness, ...
- Continue the effort of making the user interface look & feel more modern, mobile friendly, and better localizable



Long Term

- Constraint Solver: instructor and student scheduling, team building
- UI: moving from Struts to GWT, localization, documentation, mobile
- Interfaces: IMS Course Planning & Scheduling, more APIs and XMLs

For more details, please see us at the conference

- Getting Started with UniTime (Sunday, 9 am in Liszt)
- UniTime: State of the Project (Monday, 2:30 pm in Debussy)
- UniTime Introduction (Monday, 5:30 pm, Showcase Reception)
- Student Scheduling at Purdue University (Tuesday, 11:15am in Debussy)
- Internationalization of UniTime (Wednesday 11:00 am in Debussy)
- Or visit www.unitime.org

An online demo is available at <https://demo.unitime.org>