

# WHAT'S NEW IN THE FAUST ECOSYSTEM IN 2024?

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GRAME - INRIA LYON



<https://github.com/sletz/IFC-2024>

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# AGENDA

Faust consortium and AFFA, presented tomorrow  
during last round table

Compiler: new backends, new options (+ some  
novelties for this afternoon round table)

Widget Modulation (Yann Orlarey), tomorrow morning

Web related developments (+ Michel Buffa, tomorrow  
afternoon)

Emeraude team and projects

Commercial applications

# COMPILER: BACKENDS AND ARCHITECTURES

Four new backends in the compiler:

- **JAX backend** contributed by David Braun to target Machine Learning kind of applications  
(see [DawDreamer](#) and [PAW 2023 presentation](#))
- **JSFX backend** contributed by Johann Philippe to export Faust DSP for Reaper ([Tutorial](#))
- **Cmajor backend:** Cmajor is the rebirth of the SOUL project (Julian Storer, Cesare Ferrari)  
([Tutorial](#)) and hybridation project with Faust
- **Codebox/RNBO backend:** export Max-like patches as C++/wasm ([Tutorial](#))

## COMPILER: OPTIONS

Reworked **-os** option (one-sample) to generate C/C++ code adapted to FPGA export (**Emeraude FAST project**)

New **-ec** option (external control) to separate **control** and **compute** functions

Reworked **-memX** option (memory-manager) also for the FAST project

# WEB RELATED DEVELOPMENTS (1)

Faust/Web glue code rewritten in  
TypeScript/JavaScript in the **faustwasm** project

Libfaust compiler in JS to be embedded: reworked  
Faust IDE, Faust Editor, FaustPlayground (Ian Clester  
GSoC 2023)

Several scripts to compile self-contained static  
applications, in particular in **PWA mode**

## WEB RELATED DEVELOPMENTS (2)

faust-web-component (Ian Clester GSoC 2023)

Used in <https://faustdoc.grame.fr>

Web Audio Modules (WAM) (Michel Buffa and friends),  
presented tomorrow afternoon

## EMERAUDE TEAM

INRIA team combining the skills of CITI lab, GRAME  
and INRIA

Started in march 2022: Embedded Audio Systems

# EMERAUDE TEAM PROJECTS: SYFALA

Compilation of Faust and C++ on FPGA

Using Xilinx HLS (High Level Synthesis) toolchain

Transfer of C++ experience back to the Faust compiler  
(e.g. extraction/compilation of FIR/IIR structure)

# EMERAUDE TEAM PROJECTS: LINUX SUPPORT FOR SYFALA

Alpine Linux running on the Zybo ARM CPU

Allowing for simpler deployment of MIDI, OSC, GUI...  
based control

# EMERAUDE TEAM PROJECTS: SYFALA PIPEWIRE SUPPORT

Multi channels audio protocol over ethernet: JACK client <==> Linux on the Zybo (ARM) <==> FPGA

Two sister 32 channels audio board developed during  
the FAST project

PLASMA project

## EMERAUDE TEAM PROJECTS: FAUST2VHDL TOOL

Directly compile Faust signal IR in VHDL with a "signal backend"

But quite limited for now (missing mathematical functions, access to DDR memory...)

# EMERAUDE TEAM PROJECTS: FIXED-POINT EXTENSION FOR FAUST

Extending the interval computation associated with the signal IR with FP precision

Annotating all computation steps with the needed precision (MSB,LSB)

To be used with the HLS based chain or faust2vhdl

# COMMERCIAL APPLICATIONS

ExpressiveE: Noisy 2

ExpressiveE: Arche collection

Punk Labs: 6 plugins (with Faust and Rust)

# ECOSYSTEM

Faust site

Powered by Faust with more than 220 projects

Faust documentation

Faust libraries

Discord channel with more than 550 people

