

# NEW DATA TYPES - MATRICES

- $\{\epsilon\} \text{mat}\{2\ 3\ 4\} \{\epsilon\ x_2\ x_3\ x_4\}$
- Examples:
  - `mat2` (= `mat2x2`): float, 2 columns, 2 rows
  - `dmat3` (= `dmat3x3`): double, 3 columns, 3 rows
  - `mat3x4`: float, 3 columns, 4 rows
- Matrices (on default) are **column-major** (but can be changed)

- Accessors:

```
mat3x4 matrix;  
vec3 col1 = matrix[0]; // First column  
float val1 = matrix[2][1]; // Third column, second row  
float val2 = matrix[2].x; // val2 == val1
```
- Arithmetic operations behave as expected
  - $\text{mat}_{\alpha \times \beta} * \text{vec}_{\beta} = \text{vec}_{\beta}$
  - $\text{mat}_{\alpha \times \beta} * \text{mat}_{\alpha \times \beta} = \text{mat}_{\alpha \times \beta}$
  - $\text{vec}_{\alpha} * \text{mat}_{\beta \times \delta}$  compile error

# TEXTURES

- Textures
  - 1D, 2D, 3D images associated with a sampling function
  - Linear sampling, (bi- / tri-)linear interpolation, anisotropic interpolation,
- In GLSL: opaque type `sampler1D`, `sampler2D`, `sampler3D` (among others)
- Access using built-in functions:
  - `vec4 texture(sampler1D texture, float texture_coordinate);`
  - `vec4 texture(sampler2D texture, vec2 texture_coordinate);`
  - `vec4 texture(sampler3D texture, vec3 texture_coordinate);`