



**COLLOQUIUM**  
**DEPARTAMENTO DE MATEMÁTICAS**  
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***Orthogonal polynomials and Painlevé equations***

**Abstract:**

*All orthogonal polynomials satisfy a three term recurrence relation, which is very convenient for computing the polynomials and for obtaining asymptotic results. The recurrence coefficients are explicitly known for all classical orthogonal polynomials. For semi-classical orthogonal polynomials, which are usually obtained by modifications of the weight functions of classical orthogonal polynomials, the recurrence coefficients are not explicitly known but they satisfy (a system of) non-linear recurrence relations. These non-linear equations can often be identified as discrete Painlevé equations. We will give several examples: Freud weights, generalized Charlier polynomials, generalized Meixner polynomials, orthogonal polynomials on the unit circle, etc. In many cases, the recurrence coefficients also satisfy non-linear differential equations with respect to one of the parameters, and these can often be identified as one of the six Painlevé differential equations.*

**Hora: 10:45**

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