One of the many interesting algebraic objects associated to a given rational elliptic curve, $E$, is its full-torsion representation $\rho_E : \text{Gal}(\overline{\mathbb{Q}}/\mathbb{Q}) \to \text{GL}_2(\widehat{\mathbb{Z}})$. Generalizing this idea, one can create another full-torsion Galois representation, $\rho_{(E_1,E_2)} : \text{Gal}(\overline{\mathbb{Q}}/\mathbb{Q}) \to \left(\text{GL}_2(\widehat{\mathbb{Z}})\right)^2$ associated to a pair $(E_1,E_2)$ of rational elliptic curves. The goal of this talk is to provide an infinite number of concrete examples of pairs of elliptic curves whose associated full-torsion Galois representation $\rho_{(E_1,E_2)}$ has maximal image. (Received September 21, 2015)