University of Colorado
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Problem of the Month
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Let $\triangle ABC$ be a triangle in the plane and let P be an interior point. Let A', B', C' be the points of the perpendicular projections of P onto the lines BC, AC, and AB, respectively. Let the inradii of the triangles $\triangle PAC'$, $\triangle PC'B$, $\triangle PBA'$, $\triangle PA'C$, $\triangle PCB'$ and $\triangle PB'A$ be $r_1, r_2, \ldots, r_6$, respectively. Determine the locus of those points P for which $r_1 + r_3 + r_5 = r_2 + r_4 + r_6$.