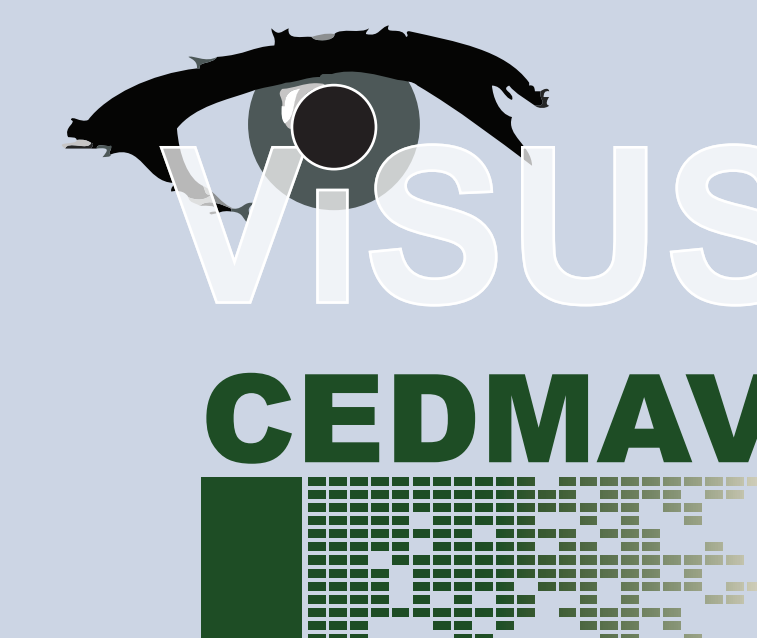


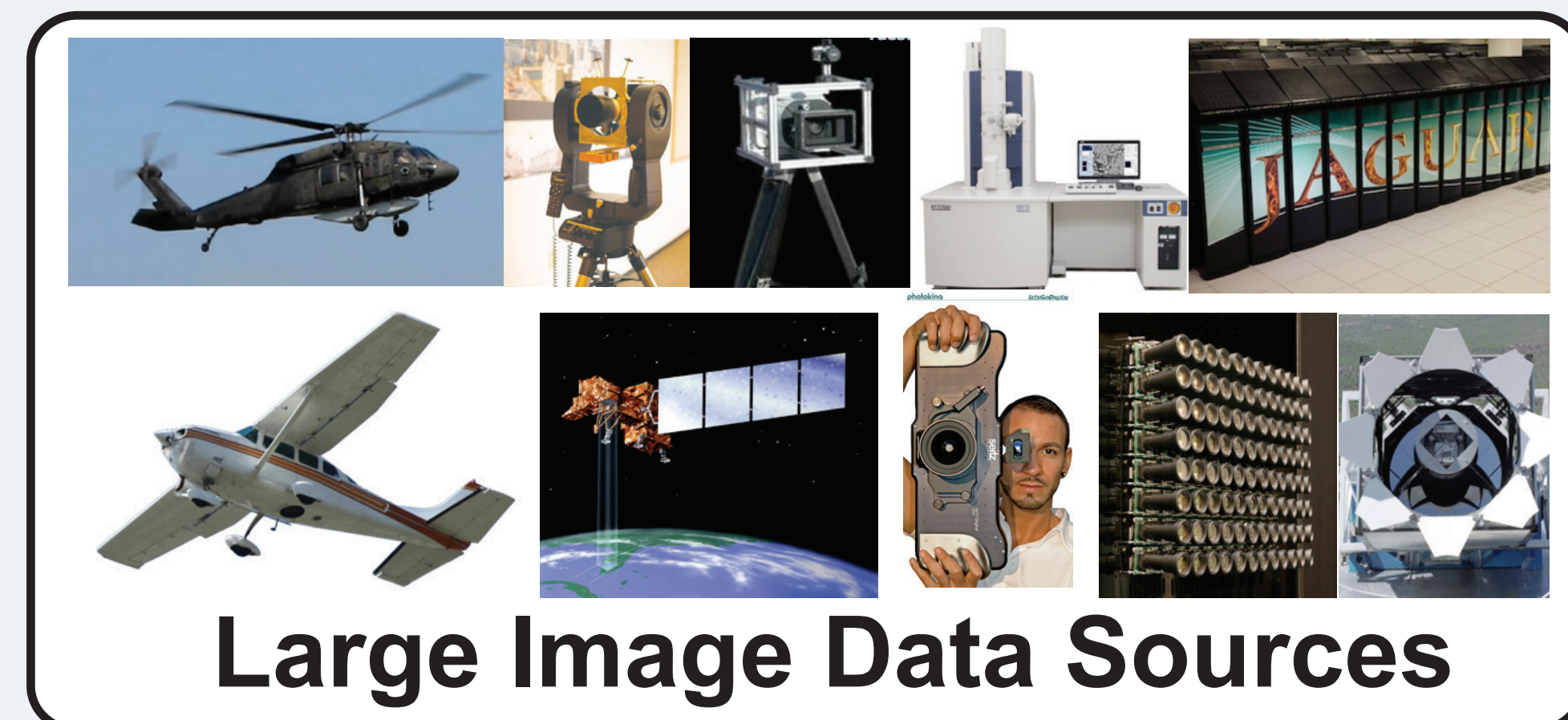
Interactive Digital Photography at Scale

Brian Summa and Valerio Pascucci



Publications:

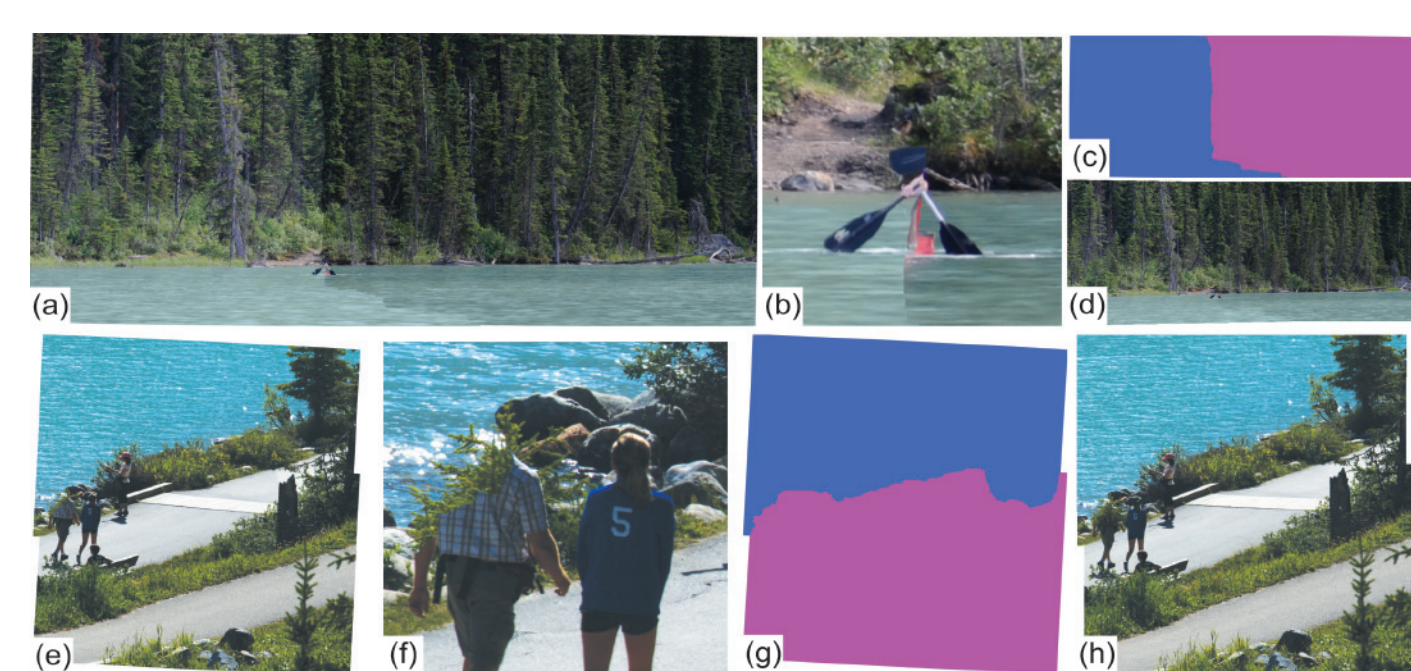
Panorama Weaving: Fast and Flexible Seam Processing, B. Summa, J. Tierny and V. Pascucci, ACM Transactions on Graphics (TOG) Volume 31, Issue 4 (July 2012) Proceedings of ACM SIGGRAPH 2012, Article 83.
Interactive Editing of Massive Imagery Made Simple: Turning Atlanta into Atlantis, B. Summa, G. Scorzelli, M. Jiang, P.-T. Bremer, V. Pascucci. ACM Transactions on Graphics (TOG), Volume 30, Issue 2 (April 2011), Article 7. Invited talk at SIGGRAPH 2011.



Panorama Creation Pipeline



Boundaries



Minimal image boundaries are not always visually ideal ...



or unique

Minimal Image Boundaries



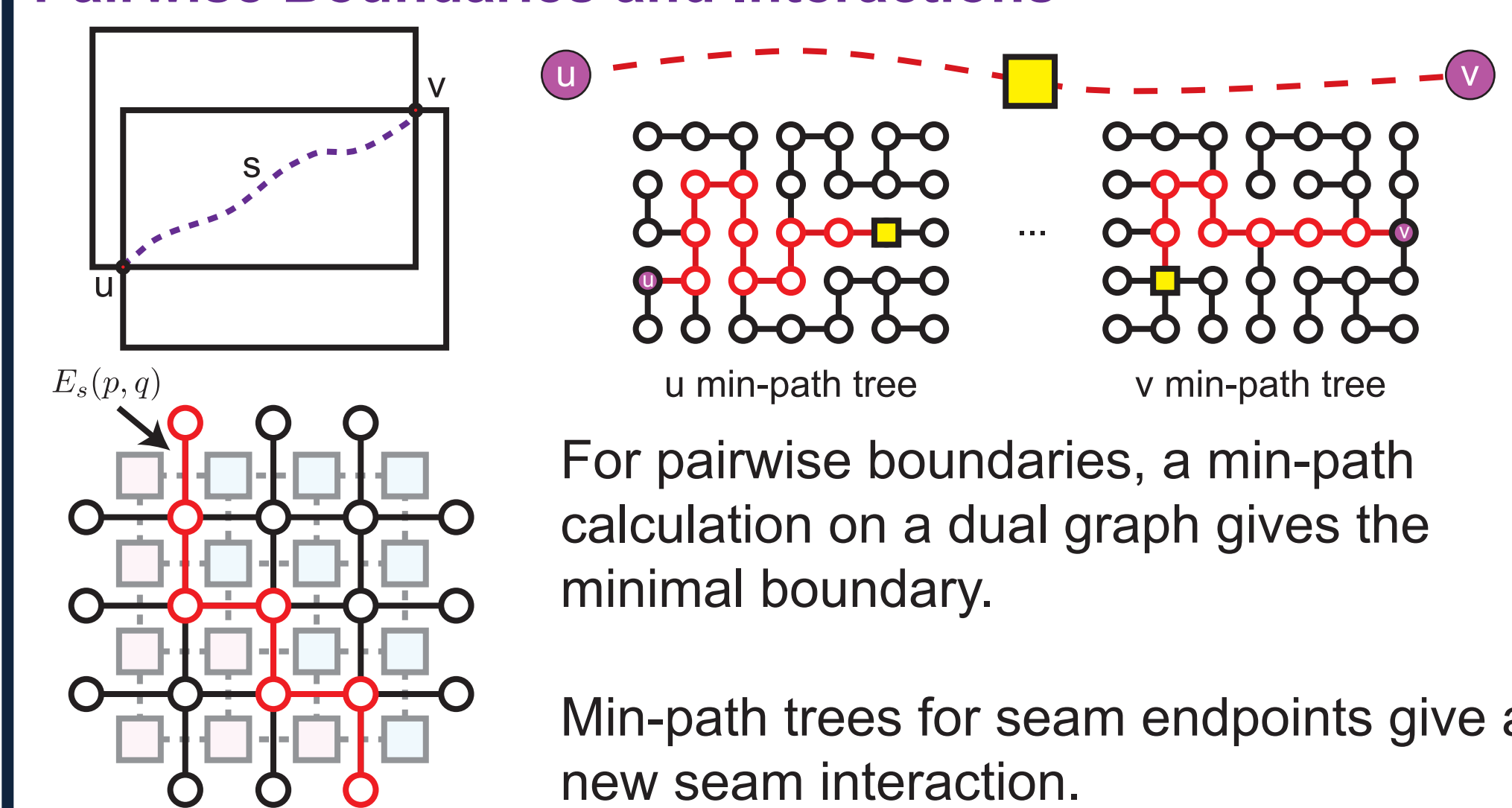
$$E(L) = \sum_{p,q \in \mathcal{N}} E_s(p,q)$$

$$E_s(p,q) = \|I_{L(p)}(p) - I_{L(q)}(p)\| + \|I_{L(p)}(q) - I_{L(q)}(q)\|$$

$$E_s(p,q) = \|\nabla I_{L(p)}(p) - \nabla I_{L(q)}(p)\| + \|\nabla I_{L(p)}(q) - \nabla I_{L(q)}(q)\|$$

The image boundary problem is finding a pixel labeling that minimizes the transition between the images.

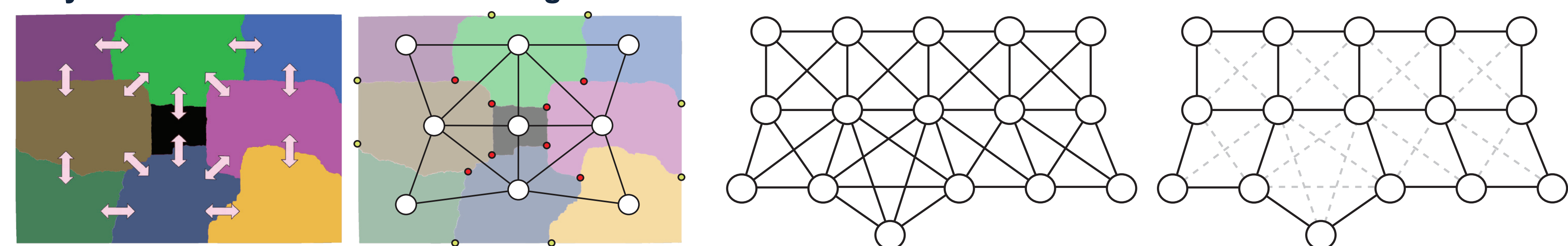
Pairwise Boundaries and Interactions



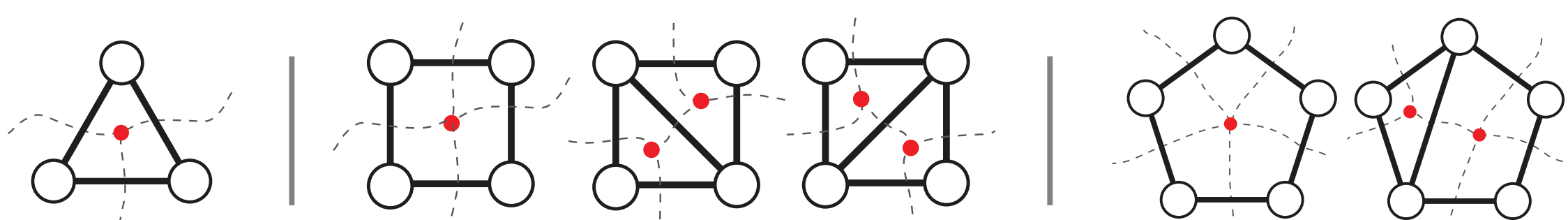
For pairwise boundaries, a min-path calculation on a dual graph gives the minimal boundary.

Min-path trees for seam endpoints give a new seam interaction.

Adjacency Mesh to Encode Panorama Image Relations



The images, pairwise boundaries, and boundary intersections can be represented as a mesh built from image pairwise relations.



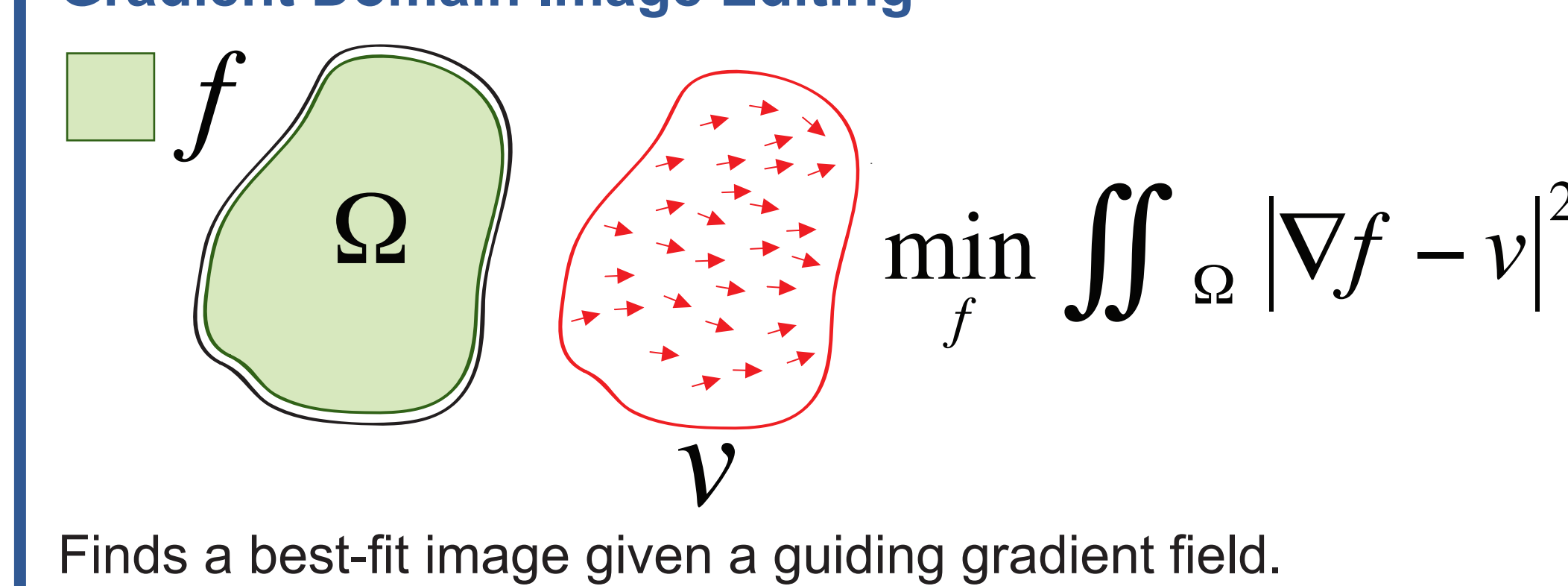
Color Correction

Panorama Stitching



Seamless Cloning

Gradient Domain Image Editing



Finds a best-fit image given a guiding gradient field.

Solving

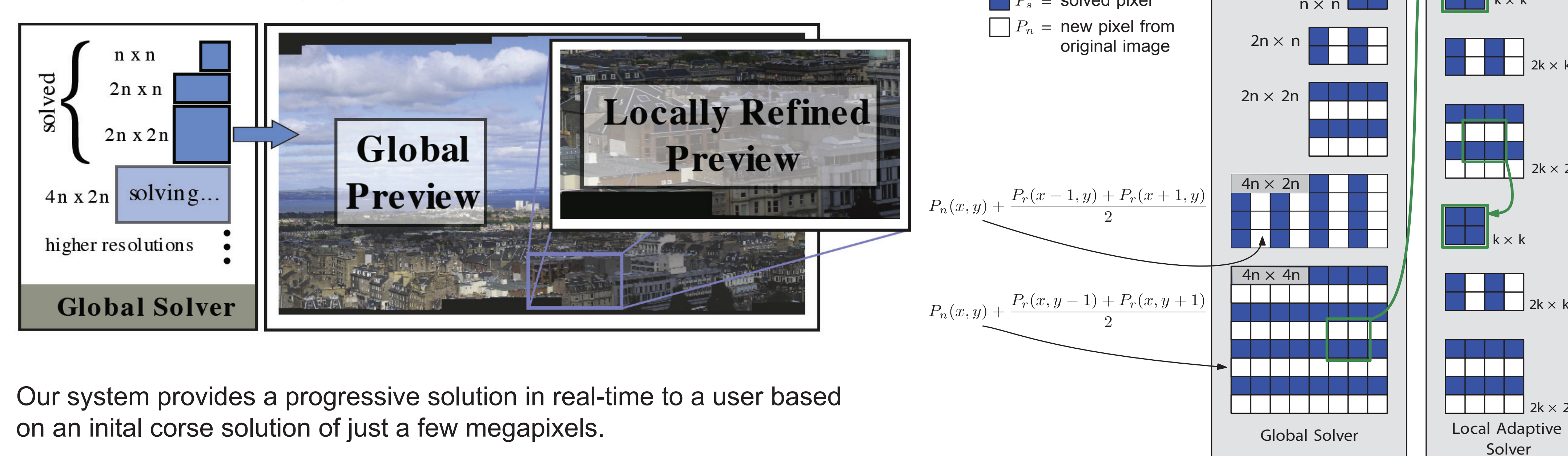
$$4p - x_0 - x_1 - y_0 - y_1 = b$$

encodes gradient and constraints

for each pixel

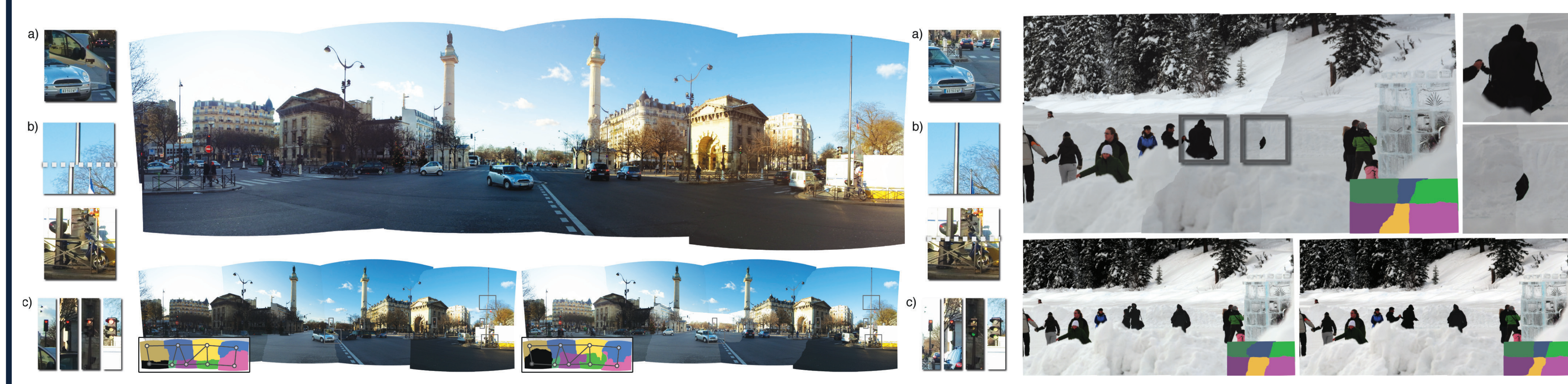
Found by the creation and solve of a large linear system.

Our Interactive Editing System



Our system provides a progressive solution in real-time to a user based on an initial coarse solution of just a few megapixels.

Results



Results

