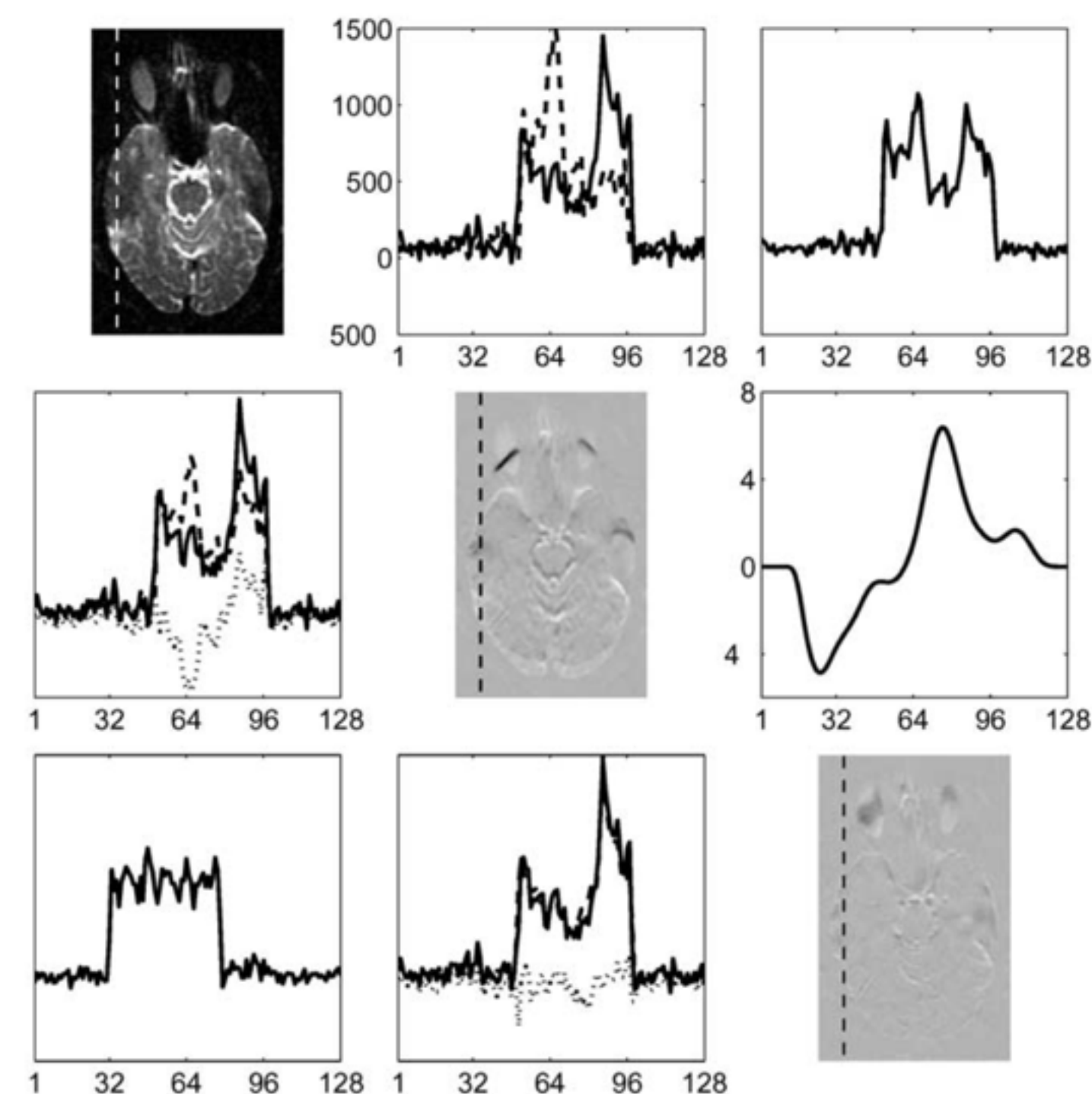# INVERSE FOR SURE

$$\underbrace{\begin{bmatrix} \widehat{\mathbf{e}_+} \\ \widehat{\mathbf{e}_+} \end{bmatrix}}_{2n \times 1} = \underbrace{\mathbf{R(b)}}_{2n \times 2n} \underbrace{\begin{bmatrix} \mathbf{f}_+ \\ \mathbf{f}_- \end{bmatrix}}_{2n \times 1}$$
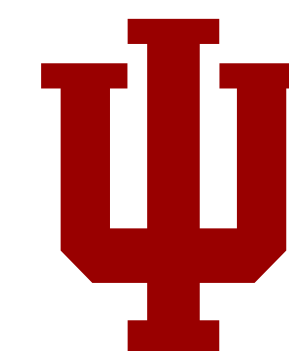
$$\underbrace{\mathbf{R(b)}}_{2n \times 2n} = \underbrace{\mathbf{I}}_{2n \times 2n} - \underbrace{\begin{bmatrix} \mathbf{K}_+(\mathbf{b}) \\ \mathbf{K}_-(\mathbf{b}) \end{bmatrix}}_{2n \times 1}$$

$$\times \underbrace{\left(\begin{bmatrix} \mathbf{K}_+^T(\mathbf{b}) & \mathbf{K}_-^T(\mathbf{b}) \end{bmatrix} \begin{bmatrix} \mathbf{K}_+(\mathbf{b}) \\ \mathbf{K}_-(\mathbf{b}) \end{bmatrix} \right)^{-1}}_{n \times n}$$

$$\times \underbrace{\begin{bmatrix} \mathbf{K}_+^T(\mathbf{b}) & \mathbf{K}_-^T(\mathbf{b}) \end{bmatrix}}_{n \times 2n},$$

$$\min_{\text{arg}=\mathbf{b}} O(\mathbf{b}) = \left(\sum_{c=1}^{m} \begin{bmatrix} \mathbf{f}_{c+}^T & \mathbf{f}_{c-}^T \end{bmatrix} \mathbf{R}_c(\mathbf{b}) \begin{bmatrix} \mathbf{f}_{c+} \\ \mathbf{f}_{c-} \end{bmatrix} \right)$$

JACOBIAN MODULATION

$$f_+(\mathbf{x} - [0 \quad d(\mathbf{x}, \mathbf{b}) \quad 0]^T)\left(1 - \frac{\partial d}{\partial y}\bigg|_{\mathbf{x}}\right)$$

$$\approx f_-(\mathbf{x} + [0 \quad d(\mathbf{x}, \mathbf{b}) \quad 0]^T)\left(1 + \frac{\partial d}{\partial y}\bigg|_{\mathbf{x}}\right)$$

$$\sum_{x \in V}\left(f_+(\mathbf{x} - [0 \quad d(\mathbf{x}, \mathbf{b}) \quad 0]^T)\left(1 - \frac{\partial d}{\partial y}\bigg|_{\mathbf{x}}\right)\right.$$

$$\left. - f_-(\mathbf{x} + [0 \quad d(\mathbf{x}, \mathbf{b}) \quad 0]^T)\left(1 + \frac{\partial d}{\partial y}\bigg|_{\mathbf{x}}\right)\right)^2$$

$$\underbrace{\mathbf{B}(\mathbf{x})}_{n \times m} = \underbrace{\mathbf{B}_z(z)}_{n_z \times m_z} \otimes \underbrace{\mathbf{B}_y(y)}_{n_y \times m_y} \otimes \underbrace{\mathbf{B}_x(x)}_{n_x \times m_x}$$

$$\underbrace{\frac{d\mathbf{f}_+}{d\mathbf{b}}}_{n \times m} = -diag\left(\frac{\partial \mathbf{f}_+}{\partial y}\right)\underbrace{\mathbf{B}}_{n \times m} - \underbrace{diag(\mathbf{f}_+)}_{n \times n}\underbrace{\frac{\partial \mathbf{B}}{\partial y}}_{n \times m}$$

$$\underbrace{\mathbf{b}_i}_{m \times 1} = \underbrace{\mathbf{b}_{i-1}}_{m \times 1}$$

$$+ \left(\underbrace{\left[\left(\frac{d\mathbf{f}_+}{d\mathbf{b}}\right)^T \quad \left(\frac{d\mathbf{f}_-}{d\mathbf{b}}\right)^T\right]}_{m \times 2n}\underbrace{\begin{bmatrix} \mathbf{I} & -\mathbf{I} \\ -\mathbf{I} & \mathbf{I} \end{bmatrix}}_{2n \times 2n}\underbrace{\begin{bmatrix} \dfrac{d\mathbf{f}_+}{d\mathbf{b}} \\ \dfrac{d\mathbf{f}_-}{d\mathbf{b}} \end{bmatrix}}_{2n \times m}\right)^{-1}$$

$$\times \underbrace{\left[\left(\frac{d\mathbf{f}_+}{d\mathbf{b}}\right)^T \quad \left(\frac{d\mathbf{f}_-}{d\mathbf{b}}\right)^T\right]}_{m \times 2n}\underbrace{\begin{bmatrix} \mathbf{I} & -\mathbf{I} \\ -\mathbf{I} & \mathbf{I} \end{bmatrix}}_{2n \times 2n}\underbrace{\begin{bmatrix} \mathbf{f}_+ \\ \mathbf{f}_- \end{bmatrix}}_{2n \times 1}$$