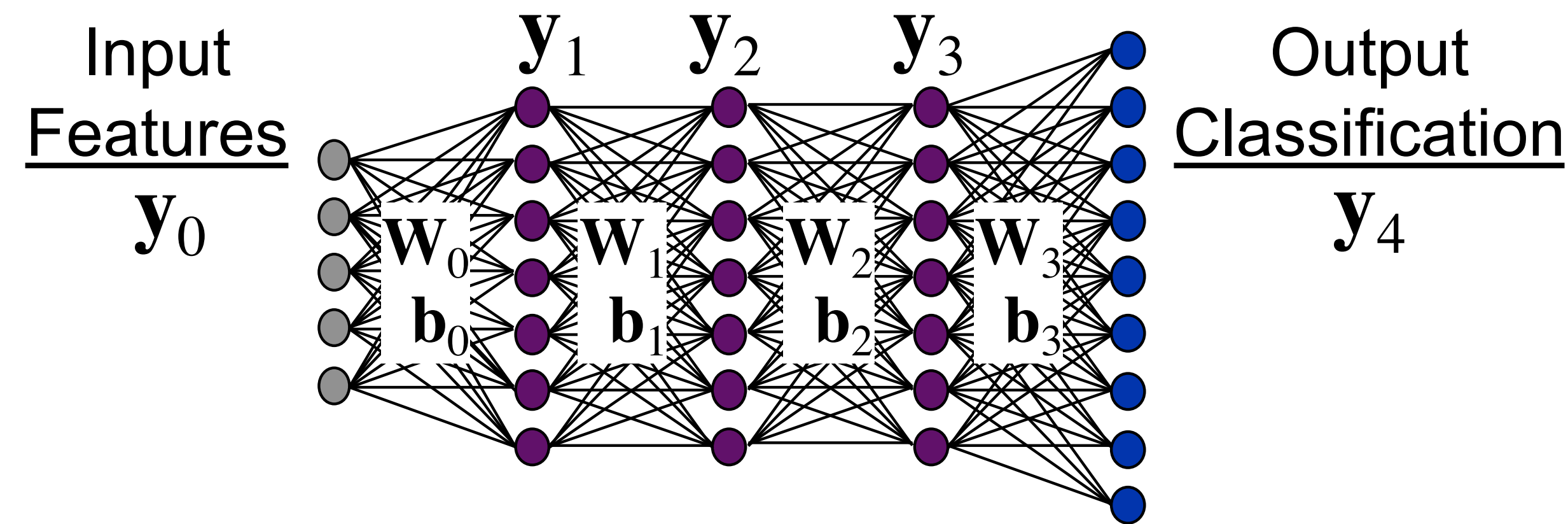


Deep Neural Network (DNN) Challenges

- Deep Neural Networks (DNNs) are a core tool for machine learning; are dominated by weight matrices W_i

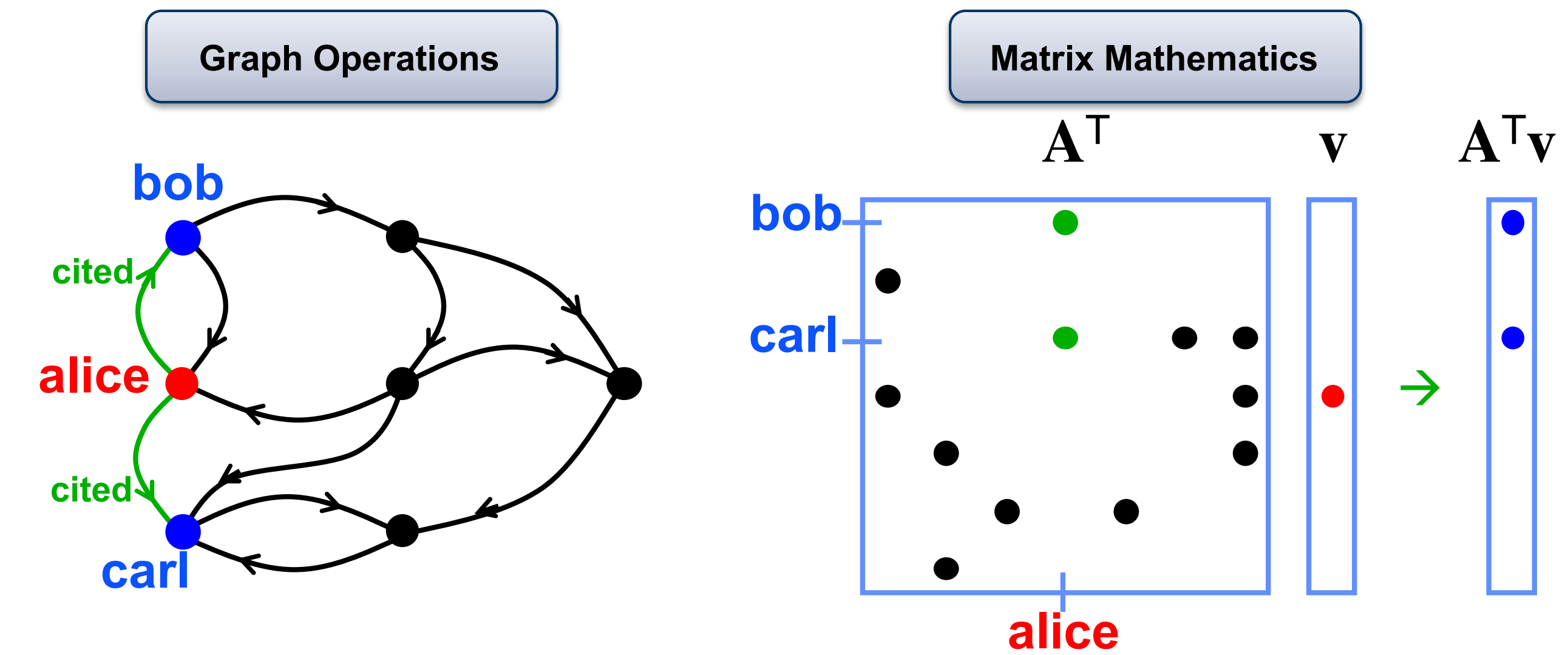


- Better DNNs require much bigger weight matrices
- Solution: use sparse weight matrices (set most values to zero)
- GraphBLAS: provides high performance sparse matrices

$$y_{i+1} = h(W_i y_i + b_i)$$

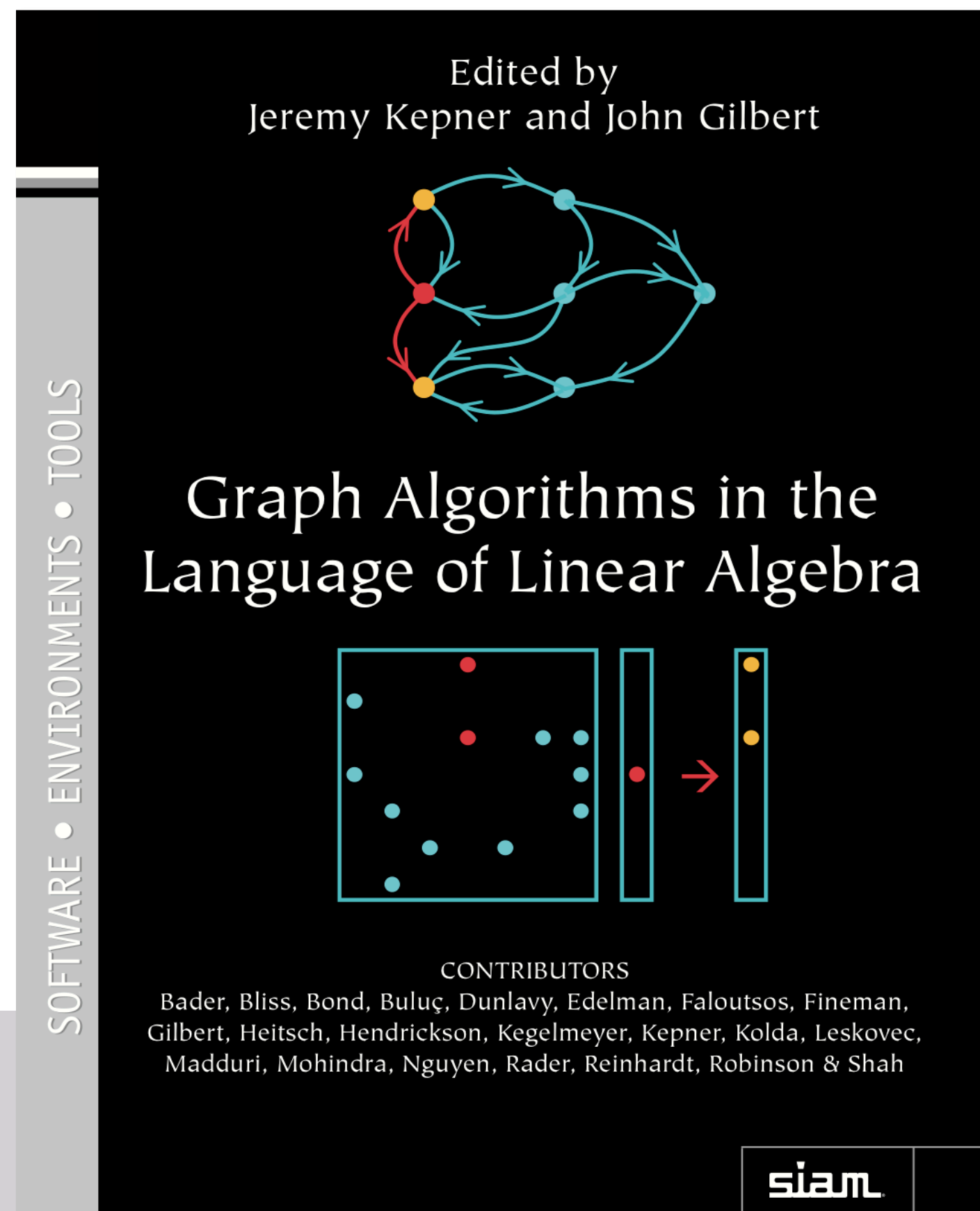
GraphBLAS Mathematics

- Graph and neural network operations can be implemented using matrix mathematics



- Finding nearest neighbors in a graph is the same as matrix multiply
- Also good for computing sparse DNNs

GraphBLAS foundation



- Graph Algorithms in the Language of Linear Algebra
- Foundation of GraphBLAS.org standard

Result: 250x faster

