# CRMDA Research Skill Inventory

**Name:** ____________________  **Date:** ________

## (1) Research Design and Project Planning
- Formulation of testable research questions
- Methods for data gathering
  - Surveys
  - Experiments (human subjects)
  - Quasi-experiments
  - Planned missing designs
- Power analysis
- Causality analysis (matching methods)
- Reliability analysis of survey results

## (2) Data Management
- Importation, management, reshaping of data
- HIPPA compliant entry and storage of data (REDCap)

## (3) Regression Analysis
- General linear model (ANOVA, GLS, mediation & moderation, etc.)
- Generalized linear model (Count & categorical outcomes)
- Hierarchical random-effects models (HLM/MLM/GLMM).
- Structural Equation Models (SEM, EFA, CFA)
- Mixture modeling, latent class analysis, growth mixture models, latent transition models
- Regression diagnostics, robust parameter estimates, bootstrapping.
- Parameter regularization (lasso, ridge regression, LAR)
- Repeated measures, econometric panel models
- Dynamic P-technique
- Growth curves (mixture effects)
- Dynamic factor analysis
- Continuous-time models (differential equations)

## (4) Psychometrics
- Instrument development and validation (including pilot study design)
- Item Response Theory (IRT), item linking and equating
- Factor analysis
- Measurement invariance, differential item functioning (DIF)

## (5) The Missing Data Problem
- Multiple Imputation (MI)
  - EM MVN methods (NORM, Amelia)
  - Chained Equations (MICE, mi)
- SEM: “FIML”
- Planned missing data designs (two method and three form designs)

## (8) Other Data Analysis
- GIS
- Big Data visualization (3d graphics)
- Analysis of fMRI
- Spatial data analysis

## (9) Programming
- Statistical Packages
  - SAS
  - R
  - SPSS
  - Stata
  - Mplus
  - flexMIRT
  - Other ____________
- Qualitative Analysis Packages
  - Atlas TI
  - Nvivo
- Operating Systems
  - Windows
  - Macintosh
  - Unix/Linux
- Calculation Frameworks
  - Julia
  - Mathematica
  - Matlab (or Octave)
  - LabView
- Computer Languages
  - C (C++)
  - Fortran
  - Java
  - Other ____________
- Editors & Development Environments
  - Visual C++
  - Emacs
  - Notepad++
  - RStudio
- Parallel computing
- LaTeX
- Web Programming
  - HTML
  - PHP or Perl
  - SQL