Competitor landscape: multiple imputation / missing-data tools in R

Package	Approach (MI / missing-data engine)	Random effects / multilevel support	Variable types (imputation)	Most relevant reference / URL
`mice`	Fully Conditional Specification (FCS) / chained equations MI	Primarily single-level FCS; provides dedicated *two-level* methods (e.g., `2l.pan`, `2l.lmer`) for clustered settings	Broad at single level (continuous, binary, unordered/ordered categorical); multilevel methods more limited in scope	CRAN: mice; van Buuren & Groothuis-Oudshoorn 2011 (JSS)
`miceadds`	Extensions for `mice` (incl. multilevel engines)	`mice.impute.ml.lmer`: described for hierarchical *or cross-classified* structures; supports arbitrary levels and random slopes (lme4-based; see docs for scope/limits)	Mainly continuous / lmer-style settings (see function docs; nominal missing not covered in that function per docs)	CRAN: miceadds; docs: mice.impute.ml.lmer
`micemd`	Add-on methods for `mice` aimed at multilevel data	Explicitly designed for *two-level* data; distinguishes sporadically vs systematically missing patterns	Continuous, binary, count (two-level focus)	CRAN: micemd
`pan`	Joint-model-based MI for multivariate panel/clustered data	Targets clustered/panel settings (multivariate linear mixed-model machinery)	Primarily continuous / linear mixed-model context	CRAN: pan
`jomo`	Multilevel *joint modelling* MI	Designed for *multilevel* MI; supports cluster structure and substantive-model compatible MI (per package description)	Continuous plus binary/categorical via latent-normal formulations (per package description)	CRAN: jomo
`mitml`	Workflow / interface layer for multilevel MI	User-facing tools + pooling; interfaces with `pan` and `jomo` rather than providing a new MI engine	Inherits capabilities of underlying engines (`pan`/`jomo`)	CRAN: mitml
`hmi`	Hierarchical MI "driver" that translates models	Translates an analysis model into imputation calls; can use engines such as `mice` and `MCMCglmm` (per description)	Broad (depends on underlying engines and supported translations)	Speidel et al. 2020 (JSS; hmi); CRAN: hmi
`mdmb`	Model-based missing-data methods (Bayesian estimation + MI options)	States availability of multilevel models with missing predictors for Bayesian estimation; also supports substantive-model compatible MI (per description)	Regression-family oriented; scope described in package manual	CRAN: mdmb
`JointAI`	Bayesian *joint analysis + imputation* (JAGS-based)	Supports mixed models; documentation discusses grouping factors and notes no practical distinction in formula form between nested vs crossed specifications	Broad GLM/GLMM-style families (see manual); imputation integrated into model fitting (not classic FCS MI datasets)	Erler et al. (JointAI; JSS); CRAN: JointAI
`smcfcs`	Substantive-model compatible FCS MI	SMC-FCS emphasis; commonly used in single-level settings (focus is substantive-model compatibility)	Depends on substantive-model support; see package manual	CRAN: smcfcs
`phylomice`	Phylogeny-augmented `mice` methods	Uses phylogenetic covariance inputs; not primarily positioned as general multilevel/cross-classified MI	Phylogeny-informed MI methods (docs note development/experimental status)	GitHub: pdrhlik/phylomice
`Rphylopars`	Phylogenetic comparative imputation/prediction under evolutionary models	Phylogenetic model-based missing-data handling (not general-purpose FCS MI with arbitrary random effects)	Primarily continuous-trait PCM framework; see manual for scope	CRAN: Rphylopars

Note: For "complex random factors" (multi-level and/or cross-classified structures), the most direct R-package comparator in an MI workflow is typically `miceadds` (lme4-based multilevel imputation). For a Bayesian joint modelling alternative where imputation is integrated with analysis, `JointAI` is a prominent option.